# Radical Trust Works

## An Investigation of Digital Visitor Generated Content and Visitor Engagement in Museum Spaces

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## DECLARATION OF ORIGINALITY

I, Claire Stephanie Ross confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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# ABSTRACT

Visitor generated content projects are becoming increasingly significant in the development and delivery of engaging visitor experiences in museums in the UK, but the rationale behind them and the impact they are having on not only visitor engagement but also museum practice are not always clear. There is a requirement to understand and articulate the impact of digital visitor co-creation in the museum environment and to discuss the challenges of implementing digital innovation projects in museums and the implications this has on institutional change. This thesis presents an investigation into the potential of digital visitor generated content applications in museum spaces to foster visitor engagement. The study emphasises that in order to develop engaging digital visitor generated content applications, museums must radically trust their visitors. As part of this research two digital visitor generated content systems were designed, tested, implemented and evaluated in three museums in the UK; the Grant Museum of Zoology, UCL, the Imperial War Museum, London and the Imperial War Museum North, Manchester.

This thesis discusses the process of inception to evaluation of these applications and considers their impact on visitor engagement and goes on to investigate the challenges they bring to implementing digital innovation in a museum environment. Two key issues came out of the

research into digital visitor generated content; the importance of radical trust and the fact that post moderation with digital visitor generated content does work. Additionally this thesis identified a number of challenges about the way that digital innovation projects are conducted and how they could be overcome, and finally some recommendations are offered for museums seeking to undertake digital innovation projects in the future.

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# CHAPTER 1: INTRODUCTION

Cultural institutions are operating within an environment of profound and rapid change. This change, however, is not new; for more than a century, museums have been continuously evolving and undergoing re-invention. Museums have undergone transitions in governance[1], institutional priorities, societal value, management strategies and communication styles that have made them more inclusive, externally focused, visitor oriented, and engaged in open communication with their audiences (Anderson 2004). The difference, now, is the pace of change: museums and other cultural institutions are facing the challenges of the accelerating pace of technology-driven changes in society. The rapid expansion of accessible and affordable media technology, combined with near universal access to the Internet[2] is fundamentally altering the way society works. More rapidly than ever, digital technology and participatory applications are changing the way we access information and how we interact with one another. Continual technological innovation has led to an exponential growth of recorded and digitised information and there is a strong ethos within

[1] At national level, devolution is changing policies towards museums, with museum strategies in Scotland, Wales and Northern Ireland. In England, changes come from the coalition government (2010 to 2015) and Arts Council England's new responsibilities for museums (http://www.artscouncil.org.uk/what-we-do/supporting-museums/). For example, since October 2010, there has been considerable anecdotal evidence that Government cuts to public funding have inflicted serious damage on the UK museums sector (Newman and Tourle 2011).

[2] In 2013, according to the Office for National Statistics; "The Internet has changed the way people go about their daily lives. Almost three quarters of adults in Great Britain used the Internet everyday (73%) in 2013, with 6 out of every 10 adults (61%) using a mobile phone or portable computer to access the Internet 'on the go'." (Office for National Statistics 2013).

museums to widen public access to collections via the ever growing digital provision of collections data. This, in conjunction with the recent and rapid transformation in authorship and participation practices resulting from the emergence of social media technologies, has caused museums to rethink the way visitors and institutions engage with and experience cultural heritage content.

This thesis investigates how digital visitor generated content systems in museum spaces impact on visitor engagement and considers the challenges of implementing digital innovation in a museum environment. As part of this research, two digital visitor generated content systems were designed, tested, implemented and evaluated in three UK based museums. This thesis discusses the process of inception to evaluation of these applications, considers their impact on visitor engagement, and goes on to investigate the challenges they bring to implementing digital innovation in a museum environment. It is worth making explicit at this point that the purpose of this research does not assume that digital visitor generated content should take the place of existing non-digital museum interpretation and resources; rather it is aimed at understanding the impact of digital visitor generated content on visitor engagement, as these type of technologies are starting to become accepted practice in museums. The research is a mixed-method study that uses both qualitative and quantitative approaches. Qualitative content analysis of digital visitor responses was conducted followed by an empirical video-based field study to determine the nature of interaction and engagement behaviour of

visitors with digital visitor generated content applications within the museum gallery. The research methods were specifically chosen to focus solely on what information could be gained from the digital visitor generated content elements alone. The purpose of this introductory chapter is to outline the statement of the problem and the motivations for this research by indicating its importance and relevance for the field of Digital Humanities. The aims and objectives of the thesis are defined and the key research questions are presented.

## 1.1 MOTIVATIONS FOR THIS STUDY

The rise of the Digital Economy[3] has transformed the UK cultural heritage sector into a creator, broadcaster and publisher of a huge range of digital content. Many museums are now digitising their collections and utilising digital media to provide increasing access in an effort to widen participation and to adhere to the idea of the visitor centred museum (Anderson 2004). A major driver of change in the behaviour of cultural institutions has been the information and communication technologies revolution that has transformed how museums engage with their audiences; new digital technologies have provided opportunities for cultural institutions to re-think the ways in which they pursue their principal objectives and they have even created new objectives. Social media technologies and the ubiquity of

[3] In June 2009, DCMS published the Digital Britain Report which has directly led to the controversial Digital Economy Bill.
http://www.culture.gov.uk/what_we_do/broadcasting/6216.aspx

digital media have opened up new ways in which cultural institutions can re-imagine their relationship with audiences (Adair et al. 2011; Simon 2010), with implications for strategic and operational planning (Falk and Sheppard 2006; Stein 2012; Proctor 2011). Many questions arise in light of new emerging patterns of digital engagement, participation and consumption with museum content. These include questions about the relevance of traditional forms of display and interpretation when faced with new forms of authorship and co-creation (Durbin 2003; Durbin 2009; Manovich 2010; Bearman and Trant 2011; Reynolds 2011; Sandhal et al. 2011); questions regarding the need to manage the combination of institutional and visitor generated content in the context of changing visitor participation dynamics (Ridge 2007; Poole 2009) and the impact this has on authenticity, authority and control (Lynch and Alberti 2010; Walker 2008; Meszaros 2006); and questions about the appropriateness of digital innovation as a mechanism for embracing these changes in museum and visitor dynamics (Ross, et al. 2013).

In recent years, with the emergence of the Social Web[4], there has been a dramatic rise in the number of methods museums can employ to encourage collaboration, sharing and engagement with visitors (Tapscott and Williams 2007; Lessig 2008; Weinberger 2008; Shirky 2009; Russo et al. 2009). Social technologies including blogs,

[4] The Social Web is represented by a class of web sites and applications in which user participation and social interaction is the primary driver of value. The second incarnation of the Web (Web 2.0) has been called the 'Social Web', because, in contrast to Web 1.0, its content can be more easily generated and published by users, and the collective intelligence of users encourages more democratic use (Kamel Boulos and Wheeler 2007). The architecture of such systems is well described by Tim O'Reilly (2005).

microblogs, wikis, photo and video sharing, and other collaborative authoring tools offer users new opportunities to engage with museum content through co-creation and participatory cultural experiences (Byrd Phillips 2013; Simon 2010). Moreover museum exhibitions have been transformed with the addition of digital technology with the aim of enhancing the visitor experience (See Tallon and Walker 2008 for key examples). Arguably these platforms and tools are creating new relationships between museums and their users. While changes in technology and its impact on contemporary society are hard to ignore, some definition is required in order to discuss the impact that these technological changes are having on museums. Henry Jenkins' definition of participatory culture is a useful one when considering the evolution of technological changes in museums:

> A participatory culture is a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection with one another (Jenkins 2006, p.xi).

Jenkins goes on to note that;

> Participatory culture is emerging as the culture absorbs and responds to the explosion of new media technologies that make it possible for average consumers to archive, annotate,

> appropriate, and recirculate media content in powerful new ways (Jenkins 2006, p.8).

As users of technology and social media[5], museum visitors are increasingly bringing new expectations for participation with them when they visit museums both physically and virtually (Stein 2012, p.217). With this rise of participatory culture, expectations of the general public to be able to comment and share their thoughts and ideas about museums and our collections are changing. Museums and other cultural organisations have made significant investments in developing and disseminating digital content online and in the physical museum space to reach and engage audiences. However, most museums have only just started to think significantly about the consequences of an emerging culture of participation (Stein 2012, p.217). Despite recent technical advances in collections access and interpretation, a number of key issues still remain. Does the rapidly changing technological environment and the expectations of cultural participation impact on the museum experience? If so, in what ways and in what context? It is becoming imperative for museums to understand not only how, and why their digital content is being

[5] According to Ofcom's Adults' media use and attitudes report (Ofcom 2013) there has been a significant increase in the self-reported volume of internet use since 2011. Overall estimated weekly volume of use of the internet among users has increased to an average of just less than 17 hours per week (Ofcom 2013, p.4). In terms of social media; 64% of all adult internet users in the UK now have their own social networking site profile an increase from 59% in 2011 (*ibid*, p.88). In 2012, half (50%) of those with a social networking site profile say they visit social networking sites more than once a day (*ibid*, p.99).

encountered, but also how it is transforming visitor experiences. Previous ways of classifying and understanding visitors typically used demographic data or analysed search and visiting patterning. However, these methods often lack the depth of information needed to understand why people engage in certain behaviours and how this impacts upon levels of engagement. Driving the exploration of digital innovation and visitor engagement is a keenness to capture some of the features of the change and disruption which digital innovation is liable to bring about, and to reflect on how museums, as resilient, traditionally analogue institutions may resist or, conversely, embrace these changes as they engage with the creative opportunities they afford.

Continual technological innovation of information has enabled the exponential growth in cultural digitisation projects[6]. Standards of good practice and technical digitisation guidelines have been established meaning that billions of pounds have been spent on digital projects enabling the conversion of museum, library and archive collections (Lee 2002; Hughes 2004; MacDonald 2006). More recently digital innovation funding opportunities have become available[7], stressing the

[6] See for example the ENUMERATE 2014 survey report on digitisation in cultural heritage institutions which presents the current state of digitisation in Europe. The report aims to measure digitisation efforts across Europe and considers progress made in creation, management and preservation of digital collections (Stroeker and Vogels 2014). We also thought it useful to include some examples of digitisation projects in the UK: Birmingham Museums and Art Gallery Pre-Raphaelite resource site www.preraphaelites.org, the First World War Poetry Archive www.oucs.ox.ac.uk/ww1lit, The Welsh Experience of the First World War http://cymruww1.llgc.org.uk/ and the British Library 19th Century Newspapers http://newspapers.bl.uk.

[7] For example: The Arts Council England, Arts and Humanities Research Council (AHRC) and Nesta launched a pilot funding project; The Digital Research and Development Fund for Arts and Culture in 2011, to support arts and cultural organisations across England who

perceived importance of digital technology for extending audience reach and visitor experience. For example:

> Digital technologies in particular raise the possibility that arts and cultural organisations can overcome the traditional constraints imposed by physical location, thereby expanding their audience reach. But they also open new avenues for developing the artform, create new sources of economic and cultural value, and spur new business models (Bakhshi and Throsby 2010, p.4).

Digitisation initiatives are continuing at a tremendous pace, and the digitisation of existing library, archive and museum collections is a major priority (Hughes 2012), this has been described as a 'data deluge' (Hey and Trefethen 2003) which has a huge impact on scholarly research and public engagement. However, creating digital content and opening up collections may make museum content available, but not necessarily accessible (Trant 2006) or usable. Research has previously identified a number of issues in defining and categorizing users of digital museum content (Dawson et al. 2004; Chaudhry and Jiun 2005; Booth 1998; Peacock and Brownbill 2007). There is a lack of consistent practice and standards in the museum computing field in respect of user profiling, motivation, participation and behaviour metrics (Dawson et al. 2004; Goldman and Goldman 2005). This, in addition to,

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want to work with digital technologies to: expand their audience reach and engagement and/or explore new business models. This was followed in 2012 by Nesta's "Digital R&D Fund for the Arts", which provided a £7 million fund run in collaboration with the AHRC and Arts Council England. http://www.artsdigitalrnd.org.uk/.

Government requirements for museums to justify their worth in terms of the social and economic outcomes they deliver to society to maintain funding (Edgar 2012; Holden 2004; Anderson 2013). However this has been more to do with evaluating services in terms of outcomes[8], whereas there is a lack of impact measurements for the less tangible or easily measured outcomes of impact on visitors (Wavell et al. 2002, p.3).

Cultural institutions are at a transformative period, where many institutions are considering the switch from static to more dynamic modes of content dissemination to interact with their potential audiences (Russo et al. 2007) within the galleries. Yet we know relatively little about how communities emerge around digital content, how users make meaning with digital objects, how the visitor experience is transformed by digital interaction or how these changing patterns of engagement, participation and impact should be evaluated. It is imperative to study how users of digital museum content and the institutions themselves perceive this transition, its impact and ultimately what benefit this has for both parties. The ubiquity of digital technologies has led to unprecedented changes in the provision of digital museum resources, which are beginning to transform the experience of visiting museums (Tallon and Walker 2008; Stogner

[8] The Department for Culture, Media and Sport (DCMS) has published its funding agreement between its sponsored museums and galleries for 2008-11 (2012-15 have not be published at the date of writing). DCMS sponsor these institutions indirectly but have funding agreements 2008-11 set out how the museums and galleries meet priorities and how their performance will be measured. See for example the Imperial War Museum's funding agreement (appendix 3) which includes details of the performance indicators required by the government.

2009; Proctor 2011; Parry 2010). Digital technologies and their uses within museum collections have until recently been explored primarily from a technical viewpoint (Cameron 2003a). However, such technologies can have a great impact on visitor learning and engagement. Increasingly, museum professionals are moving beyond the technology to consider the implications on visitor experience and focusing on new ways of utilising digital innovation for object interpretation and visitor engagement. In general, however, despite the growing interest in deploying digital innovation projects and digital technology in museums, there are relatively few studies that examine how visitors, both alone and with others, use new technologies when exploring museum content and the impact this has on the museum experience as a whole.

In order to create improved access to museum resources it is important to improve our understanding of how users interact with, make sense of, and use museum digital technologies. According to Mintz (1998, p.21) museum visitors spend an average of 15 minutes at computers, compared to 15 seconds at other exhibits. Economou (1998) agrees, her research on the Euesperides prototype in the Ashmolean Museum, Oxford[9] indicated that visitors invested substantial amounts of time interacting with a computer more than any other individual exhibit (Economou 1998, p.176). However according to Morrissey and Wortz

[9] The Euesperides project was part of doctoral research at the University of Oxford investigating the potential of interactive multimedia for museums and archaeology. The project involved the design of a prototype program for the Ashmolean Museum exhibition (http://www.ashmolean.org/) and its evaluation (Economou 1998).

(1998), studies of technology in museums have tended to focus on the interactions between visitors and the technology itself, rather than the impact of technology on the relationship between the visitor and the museum. It is surprising and disappointing that since 1998, very few systematic, in depth evaluation studies of digital media in museum spaces are available. There is a need to address the use, and impact of digital technology in the context of an expanding mass of cultural heritage digital content which is believed to have tremendous potential for public engagement[10]. This thesis therefore explores how digital visitor generated content projects in museums are impacting on visitor engagement,

## 1.2 AIMS AND OBJECTIVES

This study discusses how digital visitors generated content systems in museum spaces impact on visitor engagement. It is situated within a key theme of digital humanities research; understanding the use of digital methods to enable research in the humanities that would otherwise be impossible (Terras 2012). The two digital visitor generated content systems being investigated in this thesis were the

[10] The National Co-ordinating Centre for Public Engagement (NCCPE) offers a general definition of public engagement which is applied across academia: "Public engagement brings research and higher education institutions together with the public. It generates mutual benefit – with all parties learning from each other through sharing knowledge, expertise and skills. Done well, it builds trust, understanding and collaboration, and increases the institution's relevance to, and impact on, civil society" (NCCPE 2009).

first of their kind and therefore the types of engagement made possible are entirely unprecedented in terms of digital innovation (because engagement with visitor generated content in this way could not take place without the digital applications).

The awareness of the speed with which the digital museum landscape has changed in the last few years has two-fold consequences: On the one hand it is tempting to quickly reach conclusions about the nature of engagement with digital visitor generated content before it changes or completely disappears; on the other hand it forces scholarship to be extremely careful of prescriptive conclusions that are likely to be contentious. In order to avoid reaching prescriptive conclusions, it is important for this thesis to place visitor engagement in context by understanding how digital visitor generated content applications fit with institutional ways of working. Therefore, by establishing the challenges faced when implementing digital innovation projects in a museum environment; a more thorough understanding of digital visitor generated content and visitor engagement can be reached.

This thesis aspires to offer discussion of some of the key issues surrounding digital visitor generated content in the museum space. The overarching aim of this thesis is to investigate how digital visitor generated content systems in museum spaces impact on visitor engagement. This can then be split into two key aims of equal importance. The first aim is to investigate visitor behaviour within a complex digital information environment in order to explore visitor

engagement and the impact of digital visitor generated content. We aim to understand the complexities of visitor engagement mediated through digital visitor generated content; investigating whether or not digital visitor generated content systems can impact on visitor engagement with museum content. The second aim is to investigate the challenges of implementing digital innovation projects in a museum environment and the implications this has on institutional change. The heart of the fieldwork undertaken for this research consisted of in depth case studies of two projects in which the author was embedded – first the QRator project at UCL Museums from 2010 onwards, secondly; Social Interpretation, run at two locations under the umbrella of the Imperial War Museums between 2011 and 2013. These were selected to gain an understanding of how digital visitor generated content applications within the physical museum space impact on visitor engagement, with attention to how and to what extent the activity is structured, the characteristics of visitor behaviour, the context it takes place and how various tools and resources mediate and impact upon visitor engagement. As part of this PhD research, two digital visitor generated content systems were designed, tested, implemented and evaluated in three case study museums. This thesis discusses the process of inception to evaluation of these applications and considers their impact on visitor engagement and the challenges of implementing digital innovation projects in museums, and the ramifications this has for the sector as a whole.

Firstly this research is concerned with the critical examination of museum approaches towards digital visitor generated content in museum spaces. The research then moves to develop an awareness of the processes through which users behave in, and interact with, the museum information environment. In particular the extent digital visitor generated content applications impact on levels of engagement amongst visitors and how this is manifested is examined. Then the research explores methodological approaches for measuring and evaluating use of digital visitor generated content, specifically focusing on whether engagement relating to digital visitor generated content can be measured adequately. Finally this thesis will consider the challenges of implementing digital innovation projects in museums, not only on visitor engagement but also on the sector as a whole. Following on from these challenges, this thesis goes on to provide recommendations for the sector when carrying out digital innovation projects.

Museums are rapidly developing digital resources, in spite of a critical lack of data about the needs of the intended users of those resources (Cunliffe et al. 2001). The lack of data about the use of digital museum technology and content was a serious concern over ten years ago (Hertzum 1999), as not understanding user needs means it is not possible for museum professionals to know whether they are providing access to digital museum resources in a way that satisfies the needs of their intended users (Hertzum 1999, p.136). The situation has not improved since these studies undertaken at the beginning of the digital

shift. This remains a serious concern today as there is a paucity of published material that deals with the changes in recent technology in museum spaces. This research therefore aims to draw upon usability, participatory, museum studies and information seeking behaviour research to form the basis for an empirical conceptualisation of digital innovation projects in museums, focusing on visitor engagement with digital visitor generated content. A mix of palpable research gaps and an exponential growth in a variety of digital technology for museums leads to a relatively uncharted digital museum technology landscape that can be ideally studied with an exploratory approach to research design. This research does not aim to prove or question developed theories but to offer an initial insight into aspects of digital visitor generated content in museums that have not been studied before.

## 1.3 MAIN RESEARCH QUESTIONS

Primarily, this thesis asks *How does digital visitor generated content impact on visitor engagement within a museum context?* In order to understand the context of this research question we must also consider a much broader question; that of digital innovation. Due to the novel nature of the digital visitor generated content applications being investigated in this thesis; wewill also be asking *What are the challenges of implementing digital innovation in a museum environment?*

Central to the first research question, "How does digital visitor generated content impact on visitor engagement within a museum context?" is the definition of "engagement" in the context of digital visitor generated content. In order to accomplish this research, the concept of engagement therefore had to be (however temporarily) fixed into place. During the data collection phase, this was done by devising a set of research objectives designed to shape the definition of engagement within the context of the research. The research objectives are :

- To critically examine museum approaches towards digital visitor generated content within the museum space. This research will attempt to establish the challenges involved and specifically the approaches towards implementation, evaluation and importance of digital innovation as a catalyst for institutional change.

- To investigate the characteristics of visitor engagement with in-gallery digital visitor generated content applications. In particular the extent to which digital visitor generated content systems can increase levels of engagement amongst visitors and how this is manifested.

- To discuss visitor engagement with the museum digital environment, in order to assess the impact of digital visitor

generated content projects and level of engagement with museum content.

Efforts also need to be made to define and understand the case of digital innovation projects in museums. While this research deals with one particular concept – digital visitor generated content- it is a concept which is part of a much larger issue; that of digital innovation. Digital innovation projects are becoming increasingly significant in the development and delivery of engaging visitor experiences in museums in the UK, but the rationale behind them and the impact they are having on not only visitor engagement but also museum practice are not always clear. So the question of understanding the impact of digital visitor generated content on visitor engagement must be guided by an understanding of a baseline of characteristics that define digital innovation in museums and an awareness of the challenges museums face when implementing digital innovation projects.

This secondary research question "w*hat are the challenges of implementing digital innovation in a museum environment?*" is perhaps the most controversial of the two research questions, but also in many ways the most significant. It is essential to understand that the design, implementation and evaluation of the two digital visitor generated content systems in three UK based museums at the centre of this research are fulfilling an digital innovation function which has a bearing not only on visitor engagement but also institutional change. Therefore, understanding the challenges of implementing digital innovation

projects in museums is inextricably linked with understanding the impact of digital technology on visitor engagement in a museum environment. It is important to understand the institutional context and predisposition towards digital innovation. In order for new technologies to be accepted they need to fit within established work patterns and for there to be a desire to implement change in the organisation otherwise digital visitor generated content applications are likely to fail. However, the introduction of new technologies must be carefully managed and supported lest they alienate not only the visitors but the museum staff. This kind of innovation can only truly be achieved with a fully integrated and functional organisation which is open to change. Therefore it is important to look at the nature of digital innovation in museums and to understand how digital visitor generated content applications fit with institutional ways of working.

This is the most open-ended of the research questions addressed in this thesis and in that way is very unconventional. This research has only begun to uncover a fraction of what needs to be known about the relationship between digital innovation and museums in order to sustain the needs of both in the future. Despite not being able to answer this question in its entirety, it has been deliberately left in place in this research in order to provoke response and hopefully further empirical work in this area. This question is difficult, but timely. The impact of the changes in digital innovation on the museum must be addressed, even if no conclusive understanding can be reached.

## 1.4 SCOPE

This thesis explores visitor engagement, using museum digital visitor generated content as a case study, in order to reason about the implications of utilising digital innovation projects in museum spaces. The research is positioned within the burgeoning field known as "digital humanities." Digital humanities is defined by the Alliance of Digital Humanities Organizations (ADHO) as:

> A diverse and still emerging field that encompasses the practice of humanities research in and through information technology, and the exploration of how the humanities may evolve through their engagement with technology, media, and computational methods (ADHO 2014).[11]

The term digital humanities has been commonly used to describe the application of computational methods in the arts and humanities for 10 years, since the publication, in 2004, of the *Companion to Digital Humanities* (Schreibman et al. 2004) but it has been previously known by many terms: humanities computing, humanist informatics, literary and linguistic computing and digital resources in the humanities, to name a few (Terras et al. 2013, p.2).

Answering the question 'What is digital humanities?' is a rich source of intellectual debate for scholars. At present, this seemingly interminable

[11] This definition is from the journal Digital Humanities Quarterly. At present, this question of defining digital humanities has be repeatedly asked, but seldom answered to anyone's satisfaction. A range of subsequent definitions can be found in Terras et al. (2013) *Defining Digital Humanities*.

and inevitable question of defining digital humanities has be repeatedly asked, but a satisfactory answer has rarely been reached. It is not the intention of this thesis to join the debate around defining digital humanities. Indeed, as Terras et al. (2013, p.6) emphasise, not only does a comprehensive definition appear to be impossible to formulate, particularly when the breadth of work that is covered by a number of recent literature is considered (for example Schreibman et al. 2004; Kirschenbaum 2010; Svensson 2012; Warwick et al. 2012), it might ultimately prove unproductive, by solidifying an emerging field and constraining new, boundary-pushing work. Therefore in order to accomplish this research, this thesis has taken a more practical, empirical approach to digital humanities research. The particular emphasis of this study focuses on the integration of digital humanities research beyond academia; the involvement of the general public in digital resource creation and design; and the application of digital technologies to the cultural heritage sector[12]. Understanding digital resources is a core part of digital humanities as a discipline therefore it is important for this research to understand not only the visitor generated content outputs produced but also their creation and development.

The agenda for this research can perhaps be best summarised by the description provided by Warwick et al (2012):

[12]This stance is quite unusual in a specifically digital humanities context; there are some individuals undertaking such research for example Ratto (2011) and Hunt and Martin 2013 , but nevertheless it's not common, which is why the contribution made by this thesis is important in the understanding of how best to do such work.

> At UCLDH, we think of digital humanities as the application of computational or digital methods to humanities research or, to put it another way, the application of humanities methods to research into digital objects or phenomena. We also believe it is essential that new knowledge should be generated in both parts of the equation – both in technical research and humanities scholarship.(2012, p.11)

The discipline of digital humanities is continuously evolving, not only transforming academic teaching and research, but indeed developing all aspects of scholarly practice. Moreover, the established boundaries between, and relationships among, digital humanities scholars are being re-imagined through newly established research centres, laboratories, networks, and dynamic forms of engagement, discussion, and collaboration[13]. The result is an exciting, an inspiring, and a challenging academic landscape. The digital humanities community has become considerably more open, welcoming, and accessible; it has embraced new approaches, methods, and techniques, with this notion of digital humanities in mind, it is our intention in this thesis to highlight the creation of digital resources as an important activity in digital humanities research. As the practice of designing, testing, implementing and then understanding the visitor generated content produced by the QRator and Social Interpretation Projects within a museum context is one of the foci of this research it is important to

[13] See http://digitalhumanities.org/centernet/ for a list of international network of digital humanities centres

understand the field of digital humanities as part of that practice. The making of digital applications in itself, embodies an important activity of digital humanities (Warwick, Galina, et al. 2008, p.383): the making and testing digital tools and applications and the impact they have is fundamental to the digital humanities field (Ramsey 2011). Therefore it is important for this research not only to focus on the primary research question "*How does digital visitor generated content impact on visitor engagement within a museum context?"* but also to attempt to understand the second research question "*What are the challenges of implementing digital innovation in a museum environment?"*

As part of this research two digital visitor generated systems were designed, tested, implemented and evaluated as part of two separate digital innovation projects; QRator[14] and Social Interpretation[15]. Both digital innovation projects have as their central focus experimentation with digital visitor generated content and a desire to understand digital innovation in the context of museums. This thesis focuses on these two digital innovation projects and their digital visitor generated content applications contained within two London based museums: QRator at the Grant Museum of Zoology and Comparative Anatomy[16] (which is part of UCL Museums and Collections[17]) and Social Interpretation at the

[14] http://www.qrator.org/
[15] http://www.artsdigitalrnd.org.uk/content/social-interpretation-%E2%80%93-applying-principles-social-media-relationships-cultural-objects
[16] http://www.ucl.ac.uk/museums/zoology
[17] http://www.ucl.ac.uk/museums

Imperial War Museum London[18]; and Social Interpretation at one Manchester based museum; Imperial War Museum North[19].

The Social Interpretation Project was awarded funding from the Digital Research & Development Fund for Arts and Culture[20], a partnership between the Arts Council England, Arts & Humanities Research Council (AHRC) and National Endowment for Science, Technology and the Arts (Nesta) to support arts and cultural organisations across England who wanted to work with digital technologies to expand audience reach and engagement and explore new business models. Two branches of the family of five institutions that make up the Imperial War Museums (IWM) were host to the Social Interpretation Project. Imperial War Museum London is a National Museum and has a strong focus on the holistic integration of digital technology within its museum spaces. Imperial War Museum North is a relatively new museum which opened in 2002; it has an experimental approach to digital interpretation. The QRator project was designed and installed in the Grant Museum of Zoology and Comparative Anatomy (Grant Museum) part of UCL Museums and Collections. The Grant Museum, in comparison to IWM, is a small museum which is beginning to utilise digital technology in-gallery. The QRator project was awarded funding from the UCL Public Engagement Unit: Innovation Seed Fund[21] to support development or

[18] http://www.iwm.org.uk/visits/iwm-london
[19] http://www.iwm.org.uk/visits/iwm-north
[20] http://www.nesta.org.uk/areas_of_work/creative_economy/digital_rnd
[21] http://www.ucl.ac.uk/public-engagement/casestudies/innovationseed

models of public engagement that are new to the Higher Education sector or to UCL.

Geographically, the perspective presented in this thesis is UK-orientated, inasmuch as our case studies come from UK-based institutions. These case studies will offer specific examples of the different approaches and understandings over digital visitor generated content and digital innovation in the museum space. It is not assumed that the results from this study will necessarily produce determinant characteristics of all museums, but rather present a cross case study which will have implications for other cultural institutions and recommendations which other institutions can adopt if relevant[22].

## 1.5 THESIS OUTLINE

The research is divided into eight chapters. The opening chapter – Introduction – describes the background to the research, the motivations for the study, the aims and objectives of the investigation and the research questions for the thesis. This section also details the limits of the scope of the research. The second chapter reviews the literature on the development of digital technology in museums and the role of digital visitor generated content in museum spaces. This is followed by a discussion of the nature of digital innovation in museums. This section positions this study in context by engaging with some of

[22] It is worth mentioning that the projects discussed in this thesis are UK based, but the findings are potentially very widely applicable to all museums not just those in the UK. For example the QRator project has been cited as having international significance (Johnson et al. 2011). The Horizon Report (2011) featured QRator as a project being four to five years ahead of 'the adoption horizon' for the sector as a whole.

the key debates around museum visitors, and discusses the position of digital museum studies within the digital humanities discipline. This chapter also takes a deeper look at the nature of radical trust. Focusing on the work of Lynch and Alberti (2010), the concept is introduced to explain the belief that in order to develop engaging digital visitor generated content applications, museums must radically trust their visitors. Radical trust is a common theme throughout this thesis and will be drawn upon repeatedly to discuss the implications of digital visitor generated content in a museum environment. The third chapter describes the different methods used for this study and discusses the issues regarding the research methodology, in particular the use of visitor contributions, observations and video observations. This section also details the ethics applied to all three case studies and outlines the processes of data collection and analysis. Chapters four to six provide an in-depth analysis of visitor contributions to the digital visitor generated content application in each of the three case study institutions. Also presented in these three chapters is the analysis of field observations which consisted of observing, coding and measuring visitor times and interpreting visitor behaviours at the case study museums. Additionally an exploratory study focusing on video based observations at two of the case study museums is also discussed. Chapter seven presents the results of a comparative study involving all three of the case study museums. The eighth chapter, our last, considers the entire thesis and identifies its most important findings and recurrent themes, offering some suggestions of ways in which

museums can work to improve the ability to deal with the challenges of digital innovation. The limitations of the research are then discussed, followed by an assessment of the contribution that this research makes. Finally the possibility for future research in this area is discussed.

# CHAPTER 2: LITERATURE REVIEW

The use of digital visitor generated content in museums has two main aims: to explore new ways of engaging and interacting with museum audiences and to understand the implications for museums to increase audience engagement and impact. As such, it is important that museums create the conditions for engaging with 'the radical, interesting and vibrant opportunities presented by digital technologies' (Bayne et al. 2009, p.120) by nurturing genuinely innovative situations for visitor participation and engagement around their collections and content. In light of this, the discussion of the literature below draws on and engages with some of the key debates around museums visitors, with regards to engagement and impact, the role of digital technology in museums, the role of visitor generated content and the position of digital museum studies within digital humanities research.

As this is a relatively new area of enquiry, one of the main advantages is that there is plenty of scope for research but one of the disadvantages is discovering the relative scarcity of relevant literature. This literature review therefore not only analyses and synthesizes the available previous work on the subject (Levy and Ellis 2006), but also gathers and collectively overviews literature across different disciplines. Conducting a literature review on the nature of visitor engagement, museums, and digital technology required searching extensively across different disciplines including digital humanities, human computer interaction, museum studies, visitor research and impact studies.

In order to provide context for the research questions introduced in section 1.3 this chapter is divided into six sections. The first section looks at museums and digital technology which provides a necessary basis for understanding the background of the research. Central to the first research question, "How does digital visitor generated content impact on visitor engagement within a museum context?" is the literature discussed in section 2.2 which focuses on the role of visitor generated content and the introduces the concept of radical trust in the museum space. Section 2.3 continues to flesh out the context of the first research question by providing a discussion of visitor studies and engagement in museums. Section 2.4 focuses on digital innovation and museums; an understanding of this literature was an important factor for answering the second research question, "what are the challenges of implementing digital innovation in a museum environment?" Section 2.5 positions the research within the digital humanities discipline and reflects on the place of digital museum research within the field. This grounding in the digital humanities discipline provides support for answering the second research question. The final section provides summary of the chapter as a whole.

## 2.1 MUSEUMS AND DIGITAL TECHNOLOGY

This section of the literature review focuses on museums and digital technology in order to provide a basis for understanding the broad context of the research and to identify key areas in which to focus the

investigation. It is divided into four sections. The first section examines the definition of museums and the literature on the subject, and a working definition of museums is constructed for use in this thesis in order to restrict the scope of the investigation and to place the case studies in context. The second section focuses on the uses of digital technology in order to provide a context of digital visitor generated content projects in museum spaces. The third section highlights the development of digital technology in museums. The final section focuses on in-gallery digital technology in museums.

Over the past 30 years there has been a considerable change in attitudes to the cultural heritage sector and visitor engagement. The changing role of museums in society encompasses a shift away from the idea of museums as repositories of objects to the notion that they are repositories of knowledge (Hooper-Greenhill 1992) extending this further Anderson (2004) calls it a paradigm shift from museums as collection driven institutions to a visitor centred approach. As part of this visitor centred approach digital technologies have been used to create new museum experiences. Traditionally museums treated digital technologies as high risk, expensive and over-hyped (Parry 2010, p.1). Today, however, the contemporary museum is one in which is shaped and driven by the existence and force of digital technology (*ibid.*), technology which is actively engaged with by staff and visitors alike. The influence of digital technology on the museum sector has been described as pervasive and profound (Parry 2010, p.i); and several

authors have described how new possibilities in digital technology (including digital collection management, online developments and in-gallery installations) impact on the museum domain (Marty et al. 2003; Cameron and Kenderdine 2007; Din and Hectht 2007; Marty 2007; Tallon and Walker 2008; Parry 2010). More and more museums are now utilising innovative digital technology projects in creative and empowering ways turning institutional modes of delivery and visitor engagement to the "emerging channels of our evolving digital society" (Parry 2010, p.2). In general, however, despite the growing interest in deploying digital innovation projects in museums, there are relatively few studies that examine how digital technology is changing museum practice and more importantly how these projects are received by visitors and how visitors, both alone and with others, use these new technologies when exploring museum content and the impact this has on the museum experience as a whole. This section focuses on important contributions to digital technology and museum research and theories that provide a useful context to this research.

### 2.1.1 DEFINITION OF MUSEUMS

In order to keep the literature review relevant to the aims and objectives of the thesis it was imperative to set out the boundaries of this work: This section is a theoretical and critical reflection on museum work in its broadest sense which then goes on to refine the area of museums and digital innovation. First it is important to provide a

working definition of 'museum' to be used in this thesis. Providing definitions have an obvious practical and utilitarian purpose; it must be possible to define and describe the area in which the research is based. The way in which museums are being (and have been) defined can reveal much about the inherent assumptions and conventions that the sector holds, which offers an important insight into the dynamics of museum practice and the academic discourse which pursues it.

'Museum' is a broad term that refers to a place where objects of artistic, scientific or historic interest are displayed to the public. There is no unique definition; the OED includes three defining statements:

> "Ancient Hist. (Usu. in form Museum.) In the ancient Hellenic world: a building connected with or dedicated to the Muses or the arts inspired by them; a university building, esp. that established at Alexandria by Ptolemy Soter c280 b.c."
>
> "gen. A building, or part of a building, dedicated to the pursuit of learning or the arts; a scholar's study. Also in extended use. Obs."
>
> "A building or institution in which objects of historical, scientific, artistic, or cultural interest are preserved and exhibited. Also: the collection of objects held by such an institution." (OED Online, December 2012)

In general practice, museums are considered to be institutions dedicated to preserving and interpreting collections (Edson 2007, p.59), however notions of what a museum is and what they are for is

still hard to define. In the early 1990's Hooper-Greenhill (1992) in *Museums and the Shaping of Knowledge*, testified to the rapid and unprecedented changes happening in the museum sector. Museums were on the increase and varied in size and subject matter, challenging both the concept of a museum and what a museum was for. She wrote:

> This fixed view of the identity of museums has sometimes been firmly held and, until recently, little has disturbed it. But it is a mistake to assume that there is only one form of reality for museums, only one fixed mode of operating. Looking back into the history of museums, the realities of museums have changed many times. Museums have always had to modify how they worked, and what they did, according to the context, the plays of power, and the social, economic, and political imperatives that surrounded them. Museums, in common with all other social institutions, serve many masters, and must play many tunes accordingly. Perhaps success can be defined by the ability to balance all the tunes that must be played and still make the sound worth listening to. At the present time, in many areas where decisions are now being made about the funding and maintenance of museums, hard questions are now being asked about the justification of museums, about their role in the community, and their functions and potentials (Hooper-Greenhill 1992, p.1).

Hooper-Greenhill highlights that the form and the function of museums have varied considerably over time; contents and collections have diversified, as have museums' mission and values, and their way of operating and their management have changed. Consequently, the definition of what museums are has evolved over time. It is also difficult to state a single definition as individual countries have established their own definitions of 'museum' through legislative texts or national organisations (Desvallées and Mairesse 2010, p.56). Kavanagh (1994) stresses that the museum profession has struggled to put meaning against the term 'museum' stating; "museum people have struggled in committee after committee, in national and international settings, with ease and with great difficulties to put meaning in the word 'museum'" (Kavanagh 1994, p.1). There is also a challenge to a single definition due to vast range of museum types. In 2013 there were just under 1800 accredited museums (Arts Council England 2013)[23], all varying in their collections, ownership, management, and funding. Basic classifications of museums as suggested by the UK Museum Association include (Museums Association 2013) (Table 1):

| **Museum Type** | **Definition** |
|---|---|
| **National museums** | Established and funded by Central Government through the Department of Culture, Media and Sport (DCMS). They are generally larger institutions that hold |

[23] This includes various heritage properties, university and army museums as well as independents and national and local authority museums. It is estimated that the number may be nearer 2500 if non-accredited museums are included.

| | |
|---|---|
| | collections considered to be of national importance. There are currently 54 national museums in the UK. |
| **Local authority museums** | Owned and run by town, parish, borough, city, or county councils and other local authority bodies. They generally house collections that reflect local history and heritage. |
| **University museums** | Owned and managed by universities and their collections often relate to specific areas of academic interest. |
| **English Heritage properties** | Buildings and monuments of historic interest, many of which also hold collections inside. They are managed by English Heritage, a non-departmental public body of the UK Government. |
| **Independent museums** | Owned by registered charities and other independent bodies or trusts. They are not funded directly by the state but may receive support through government programmes. |
| **National Trust properties** | Similar to English Heritage sites, but are owned and run by the National Trust (or the National Trust for Scotland), an independent charity. The National Trust remit extends to historic |

| | |
|---|---|
| | houses and gardens, castles, industrial monuments and social history sites, as well as areas of natural beauty. |
| **Regimental museums and armouries** | Collate and preserve Britain's military heritage and are often managed by the armed services. |
| **Historic Royal Palaces** | Britain's unoccupied royal palaces are run by Historic Royal Palaces, an independent charity. |

Table 1: Categories of museums adapted from Museums Association 2013

Due to the variety of museum types a clear definition can only really refer to the general aspects that all museums have in common. The professional definition of museum most widely recognised today is that given in 2007 in the Statutes of the International Council of Museums (ICOM):

> A non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment (ICOM 2007).

ICOM state that this definition has evolved continuously in relation to changes in society; even opting to try and overhaul it in the early 2000s but it has not fundamentally changed since it was first adopted in 1974. A 'permanent institution' implies a physical place, and most museums

are housed in a single building or complex. But today, with online and outreach provision museums are much more than the sum total of their structural and functional components. All too often definitions see museums in terms of a building and the functions within it. Therefore positioning the focus of museums upon physical objects, highlighting the main role and function of a museum is that of collecting and storing objects. It becomes difficult with this definition to include museums with living collections or digital collections, or those based on a temporary exhibiting model wherein the material shown comes into the place rather than being held there permanently. It is also difficult to include a museum model based on experience or concept as in the case of science, interpretive centres or art centres. Within this view, starting with the function and things on which museums are based, the public are often thought of as an auxiliary function of museums. The ICOM definition goes on to state that museums are intended to serve 'the public', and they succeed in evoking public trust and hold authority as sources of information. However, just which public or publics is a crucial question, Horne (1992) states that "we are many 'publics' there is no 'the public' – and we are not passive...we approach a museum not on the terms of the museum but on our terms" (Horne 1992, p.63). It is difficult, therefore to class the ICOM definition as definitive, as it does not take into consideration the diversity of museum visitors. Additionally the not-for-profit aspect of the ICOM definition, does not sit well with an impartial definition. A balanced definition of museum should, ultimately, free itself from certain elements

contributed by ICOM, such as the not-for-profit aspect of a museum: a profit-making museum is still a museum, even if it is not recognised by ICOM.

The UK Museums Association (MA) therefore may suit the needs of this thesis; they offer an alternative definition:

> Museums enable people to explore collections for inspiration, learning and enjoyment. They are institutions that collect, safeguard and make accessible artefacts and specimens, which they hold in trust for society (adopted in 1998) (Museums Association 2013).

In the MA definition, the emphasis is on people rather than the public. Individuals are in charge of their own museum experience. The museum is there for people to explore their own learning and enjoyment. This takes a visitor centred approach (Anderson 2004) to defining what a museum is. This definition is also used as a benchmark for the UK Museum Accreditation Scheme (Arts Council England 2013).

There have been many attempts to analyse existing concepts of the museum and to develop a new definition of the 'museum'. Several concepts of the museum co-exist which make a common definition difficult. Burcaw (1975) for example, offers ten definitions collected from various authors and museum organisations. Judith Spielbauer (1988), takes a more visitor focused definition suggesting that museums are active and what makes a museum is the "continuous

dynamic interchange between the individual/audience/community and the evidence/information/understanding available within a particular museological setting" (Spielbauer 1987, p.249). August (1983) analysed court decisions in order to ascertain a 'workable legal definition of the term museum' (August 1983, p.137), he concluded that the ICOM definition was the most suitable. Ginsburgh and Mairesse (1997) suggest an 'alternative approach' to defining a museum by asking museum curators their views on what museums are for (1997, pp.15–33). Delcohe (2007) proposes that a museum is: "a specific function which may or may not take on the features of an institution, the objective of which is to ensure, through a sensory experience, the storage and transmission of culture understood as the entire body of acquisitions that make a man out of a being who is genetically human" (Deloche 2007, p.119). All of these definitions provide features which are descriptive, but they are not definitive. Desvallées and Mairesse (2010) suggest because there are multiple perspectives it is important to compare them in order to better understand the museum phenomenon, which is rapidly developing and constantly evolving.

Many of the discussions about the museum centre around the questions of definition and terms like 'traditional' and 'new' museums are part of the historical landscape. Worts and Morrisey (Worts and Morrisey 1995) state that museums express a need to answer the question of "What it means to be human?" They continue:

> Part of our contention is that the museum is not simply a building, a collection and expert information. Rather, it is perhaps more fundamentally 'a place of the muses', which is first and foremost a creative psychic space with the experience of individuals. The physical museum in which we work is better understood as providing a set of conditions that can facilitate an individual's experience of the muses. Therefore, then the new communication technologies need to be understood and developed with an awareness of their role as facilitating experience- not delivering it (Worts and Morrisey 1995, p.177).

Deloche (2007) states that a new definition of a museum must take into consideration the historical character of museums (both relative and evolving) as well as including the concept of a museum which should be sufficiently general to be adapted to all museums (Deloche 2007, p.115). Deloche believes that the debate between giving priority to the collections or the public should not be included in the definition itself (*ibid.*). However, this thesis is in disagreement with Deloche, and believes that the definition of a museum should give priority to both the object and to the visitor. It is clear from the range of definitions, that there is a dichotomy between two strands of thought. The first, is more traditional, the collections based approach. The second, based on new museology (Vergo 1989), have shifted attention from collections towards visitors. While the ICOM and MA definition are robust, they both attempt to balance traditional and new museology perspectives

and therefore do not cover all aspects fully. Consequently, due to the nature of this thesis and the research outcomes which show that any definition of a museum has to be visitor centred rather than object centred. In 2013, the Museums Association commissioned research into the public perception of museums; the report examines what people perceive as the main purpose of museums and their role in society (Britian Thinks 2013). The report highlights that the public have a sophisticated understanding of museums, believing that museums had an active role in sharing new knowledge, rather than a passive building storing objects (*ibid*, p.4). Edson (2007) notes that the museum profession has the capacity to define and redefine the meaning of a museum as it chooses. Museums are constantly being redefined both internally and externally, and it is inevitable that definitions will continue to be in a state of flux. However if the museum strays too far from the public perception, then the resulting confusion may turn visitors away from the museum's intended purpose (Maranda 2007, p.86). Therefore it is extremely difficult to develop a new, innovative definition of 'museum' that does not stray from the public perception. Taking this into consideration, the definition of museum used in this thesis is the author's slightly amended version of the Museum Association definition;

> 'A museum enables people to explore collections and ideas for inspiration, learning and enjoyment. It is an institution that

collects, conserves, interprets and makes accessible artefacts, specimens and experiences.'

### 2.1.2 MUSEUMS' USE OF DIGITAL TECHNOLOGY

This section of the literature review focuses on museums' uses of digital technology in order to provide a context of digital visitor generated content projects in museum spaces. It is divided into six sections. The first highlights the development of digital technology in museums. The second focuses on in-gallery digital technology in museums. The third section looks briefly at a shift in focus which has taken place within museums. Section four introduces visitor generated content as a topic. The fifth section discusses visitor comments and finally, section six focuses on the challenges visitor generated content presents museums.

Online and in-gallery digital practices are the latest phase in a long process of technological innovation in museums, with the relationship between museums and computing spanning over fifty years. The history of this relationship, Parry reflects, "is one of both 'incompatibility' and 'compatibility'" (Parry 2007, p.138) a dual narrative representing contrasting readings on the history of museum computing (Parry 2007, p.xi). Parry notes, museums could be seen to be holding on to established institutional structures and resisting them being "reshaped by a modish technology" (*ibid*.). Parry (2010) goes on to state that museums can reflect upon "several decades of caution

provoked by a set of technologies…seen as expensive, high-risk, over-hyped and requiring an unfamiliar up-skilling of the workforce" (Parry 2010, p.1). Conversely, the compatibility story tells of museums' willingness to adapt and experiment in order to "assimilate new media, not just into their practice but into their very definition and sense of purpose" (Parry 2007, p.138). Parry describes these institutions as prepared to be 'accommodating' and 'tolerant' of computers; some, importantly, might be even willing to be 'recoded' in terms of their role, function and provision, of the notion of object, visit and collection, even down to their construction of their authority (Parry 2007, p.139).

There are a two elements which are particularly significant to the convergence of digital technology and museums and, as such, relevant to an analysis of museums' experiences of digital innovation from a perspective of change and transformation. Firstly; the re-negotiation of the notion of the visitor centred museum (Anderson 2004) as understood in museum practice as new forms of engagement with museum content are enabled by visitor generated content. And secondly; the nature of authorship practices brought about by new dialogical forms of discourse and new relationships in digital spaces which challenge traditional conceptions of authenticity and cultural authoritativeness (Simon 2010; Merritt 2011; Oomen and Aroyo 2011). Both of these elements will be discussed throughout the sections below.

### 2.1.3 DEVELOPMENT OF DIGITAL TECHNOLOGY IN MUSEUMS

Over the last two decades the introduction of digital applications complementing existing interpretative techniques in museum spaces has become a widely accepted practice, leading to the influence of the use of digital technology in public museum spaces to be been described as pervasive and profound (Parry 2010). Digital information and communication media now permeate the strategic visions (Royston and Sexton 2012; Hromack and Stack 2013; Stack 2013) as well as the daily operations of the majority of the cultural heritage sector (Peacock 2008). Today museums are reliant on digital media not only to manage their collections, but also to interpret, display and share their resources. Digital provision, in practice and in research, does not exist in one single place, but is widely distributed and the evidence base is complex and diverse. The following section will attempt to gather evidence of museum digital provision; in order to provide an overview of the main drivers behind the development of digital technology in museums spaces; examine the current literature on museums and digital technology and how the terms will be used within this research.

Digital technology has been used within museums for several decades, but until the mainstream acceptance of the Web between 1994 and 2002[24] the emphasis was less on using technology to deliver digital

[24] The Pew Internet Project highlight that in 1995, only 14% of adults in the U.S. were going online, this steadily increased with the rise of broadband connections and by 2002 had increased to 61% (Zickuhr and Smith 2012). The same can be said to have happened in the UK with the market share of broadband connections increasing since the index of

media to the public directly but rather as a tool for internal museum processes. As Parry points out digital technologies in museums first made an impact in the 1960's with the first adopters of 'automation' (Parry 2010, p.11). In the 1970s pressure began to mount for museums to demonstrate accountability for their collections, which led to the emergence of standards and professional bodies related to collections management, information management and documentation (Roberts 2010, p.22; Bearman and Perkins 1993; Bearman 2010). The importance of museums' digital collections management systems is well documented in the literature (Bearman 1987; Orna and Pettitt 1998; Keene 1998; Cameron 2003b; Cameron 2012) and highlights how digital technologies have reorganised a core function in museums; the management of collections. In addition, many authors have argued that museum professionals increasingly rely on digital technology to develop new and innovative management practices (for example, Fopp 1997; Marty 2006), however the use of digital technology to support interpretation, communication and mediation between museums and their visitors deserves more research. There are a number of studies focusing on the early automisation, standardisation and computerisation (Roberts and Light 1980) and there has been a strong focus on museums and their use of the web and online applications[25].

internet connectivity began in 2001 (Pollard 2007), reflecting the growing popularity of the internet, widespread availability and the growing speed of broadband connections.

[25] Notable conferences about museums and their use of the web and online applications for UK museums are the UK-based Museums Computer Group annual conference UK Museums and the Web and the US-based Museum Computer Network, along with the long-standing Museums and the Web conference held in North America. In recent years MuseumNext and the DISH conference have also brought an European element to UK museum and web technology discussions.

There has been relatively little literature on the development of in-gallery technology for visitor engagement. In recent years, the most referenced text is the edited volume by Tallon and Walker (2008); which focuses on digital technology, handheld media and the impact this is having on the museum experience. Additionally Thomas and Mintz (1998) *The Virtual and the Real* focused predominately on the ways that digital technology "affects the external relationships between museums and their audiences" (Thomas and Mintz 1998, p.xi). Despite these two examples there is still an apparent lack of literature focusing on the impact and institutional change caused by technology being implemented in museum spaces. As Parry (2010, p.7) points out "museology has been reluctant, it seems, to give the story of museum computing the same academic scrutiny as has been bestowed on other parts of our curatorial and museographical past" (Parry 2010, p.7). Parry goes on to suggest that this may be due to 'historical distance': the relevant newness of museum technology being too recent to be worthy of study. It is only in the past ten years that research has begun to present itself reflecting on cultural technology by practitioners and academics alike (see Parry 2005; Cameron and Kenderdine 2007; Tallon and Walker 2008; Parry 2010).

The last decade has seen a myriad of advances and trends in technical developments influencing the digital products emerging from UK museums. Two trends in particular have had a massive impact on museums' digital offering: social technology and the development of

smart mobile technology and connectivity. Building on the interactive and social nature of the Web, the spread of social technology which encourages collaboration, connectivity, openness and sharing, (Benkler 2006; Tapscott and Williams 2007; Lessig 2008; Weinberger 2008; Shirky 2009) is commonplace in museums. Today, the museum experience is frequently augmented by participatory technology in an increasing variety of ways; from simple commenting or tagging[26] and uploading media[27], to using social media platforms[28], to collaborative knowledge-sharing between museums and communities through 'crowdsourcing'[29] such as editing Wikipedia[30], or transcribing

[26]The pioneering steve.museum (http://www.steve.museum/) project in 2006 explored if social tagging could provide new ways to describe and access cultural heritage collections. To date, the Brooklyn Museum of Art is amongst the most innovative institutions in the way it has built tagging into their collections online http://www.brooklynmuseum.org. Their crowd curated exhibition: Click! is a prime example of their innovative use of social technology. See http://www.brooklynmuseum.org/exhibitions/click/

[27] Three prominent examples of museums and their visitors uploading content are Flickr (http://www.flickr.com), YouTube (http://www.youtube.com) and most recently Instagram (http://instagram.com/). Publications of note; the Library of Congress' use of Flickr (Springer et al. 2008; Library of Congress 2009), the development of Flickr Commons (Garvin 2009), Museum videos on YouTube (Alexander et al. 2008) and Weilenmann et al., (2013) work on social photography and Instagram.

[28] The two preeminent examples or social media platforms are Facebook (https://www.facebook.com/) and Twitter (https://twitter.com/) both are primarily platforms that allow community members to engage with each other by creating profiles and online content (see Kaplan & Haenlein 2010; Atkinson 2011). Social media are now fully incorporated into a selection of communication tools used by museums marketing and web teams to offer access to digital content, communicate ideas, encourage and facilitate discussion to a world-wide online audience.

[29] The term 'crowdsourcing' combines 'crowd', based upon the notion of the 'wisdom of crowds' (Surowiecki 2004)and 'outsourcing'. It was defined by Jeff Howe in 2006 as "the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call" (Howe 2006). Crowdsourcing is an evolving phenomenon, and the term has been broadly adopted to define different shades of public participation and contribution.

[30] Since 2010, cultural heritage institutions have collaborated with Wikipedia through a variety of projects. For example, the Smithsonian Archives of American Art donated licensed images and metadata to Wikipedia (Lieu 2011). The British Museum and the Brooklyn Museum, contributed resources and curatorial expertise to help Wikipedians improve articles (Shaykin 2010; Cohen 2010). Additionally, several institutions have committed to long-term partnerships through on-site "Wikipedians in residence" who serve as liaisons between museum staff and the Wikipedia community (Keller 2011). The British Museum was the first in the UK to bring a 'wikipedian' inside its walls in 2010 (Oomen and Aroyo 2011).

manuscripts[31]. By embracing these technologies, museums are relaxing control, which is seen by some museum professionals as threatening the foundation of their authority[32] (Chung 2008; Adair et al. 2011), nevertheless social technology is undoubtedly influencing museums digital output. Advances in mobile technology have also had a profound effect upon what museums choose to develop for visitor engagement. In 2013, half UK museums offered mobile platforms ranging from museum-provided devices and audio tours to mobile features such as GPS[33], QR codes[34] and smartphone-enabled programmes (Museums Association 2013a)[35]. In comparison, the 2013 Museum Mobile Survey[36] which had participants from the US, Canada, UK as well as responses from 26 other countries, indicated that 43% of respondents (museums) have a mobile experience and there has been a shift from developing mobile experiences that are audio tours, towards those that are interactive and link to social network sites (Tallon 2013). Smart-phones and tablet PCs have brought touch-screen technology to the mainstream, along with GPS, motion sensors, compasses, microphones, video capabilities and other sensors. These mobile developments have opened up a new set of opportunities and challenges for museums, and

[31] Transcribe Bentham (http://blogs.ucl.ac.uk/transcribe-bentham/) is an participatory project based at University College London. Its aim is to engage the public in the online transcription of original and unstudied manuscript papers written by Jeremy Bentham.
[32] A full discussion of the notion of authority is out of scope here but for an example of the discussions around authority and museums in the digital age see Byrd Phillips (2013).
[33] Global Positioning System (GPS) is a satellite navigation system that provides location and time information.
[34] Quick Response (QR) codes are a two dimensional matrix which encodes data
[35] 175 institutions took part in the Museums Association Mobile Survey. http://www.museumsassociation.org/download?id=1025016
[36] 551 museum professionals participated in the 2013 Museums & Mobile Survey from museums and related sectors in the US (75% of responses), Canada (11%), UK (7%) http://www.museumsmobile.com/wp-content/uploads/2013/07/MMSurvey-2013-report-V2.pdf.

this can be expected to continue with the spread of gestural interfaces and haptic technology as are currently found in phones and in gaming consoles like Microsoft's Kinect for Xbox (Microsoft 2013)[37].

This section's attention now turns to the key defining characteristic of museums: the visit.

### 2.1.4 DIGITAL INTERPRETATION, COMMUNICATION AND INTERACTIVITY IN THE GALLERY

Digital technologies are becoming more embedded, ubiquitous and networked, with enhanced capabilities for rich social interactions, context awareness and connectivity. The ubiquity of digital technologies in society, as we have already touched upon, has led to unprecedented changes in the provision of digital museum resources, which are beginning to transform the experience of visiting museums. Digital technologies and their uses within museum collections have until recently been explored primarily from a technical viewpoint (Cameron 2003a). However, such technologies can have a great impact on visitor experience and engagement[38]. In particular, engagement and participatory culture have gathered a lot of attention in the museums

[37] UCL Bartlett Centre for Advanced Spatial Analysis (CASA) has exhibited two projects using Kinect for controlling multimedia in a museum environment. Pigeon Sim (http://www.digitalurban.org/2012/10/pigeon-sim-fly-round-london-as-a-pigeon.html) and Survey Mapper live (http://www.surveymapper.com/) have been used in Leeds City Museum (http://www.leeds.gov.uk/museumsandgalleries/Pages/Leeds-City-Museum.aspx ) and the People's History Museum Manchester (www.phm.org.uk/). The supplier Ideum has also demonstrated preliminary work with Kinect for controlling multimedia in a museum environment, but as yet there are few other implementations (Ideum 2011).

[38] Of particular note is the work by Tallon and Walker (2008). Their edited volume *Digital Technologies and the Museum Experience* examines how new technologies can be used in museums to give visitors an innovative engaging experience.

field recently. Following Henry Jenkins' publication on the topic (2006), many authors in the museums sector have expanded on the impact these ideas are having on museum practice (Simon 2010; Richardson 2011; Stein 2012; Mack et al. 2012). Increasingly, museum professionals are moving beyond the technology to consider the implications on visitor experience[39] and focusing on new ways of utilising technology for object interpretation, visitor engagement and participation.

In the past decade, there has been a growing interest in exploring how digital and communication technologies can be developed to offer visitors a more personalised museum experience (Gay et al. 2002; Stein and Wyman 2013)[40], provide more flexible and tailored information and to facilitate interaction and discussion between visitors (Exploratorium 2001; Fleck et al. 2002; Aoki et al. 2002; Spasojevic and Kindberg 2001; Woodruff et al. 2001)[41]. Substantial time and resources

[39] Responding to the increasingly prevalent role of these technologies in combination with the concept of participatory culture, researchers have begun to deepen our understanding of their use in museums and to consider the implications on visitor experience (Russo et al. 2008; Pierroux et al. 2010; Russo et al. 2006; Pitman and Hairy 2011; Alexander et al. 2013).

[40] An interesting recent example of personalisation is the Dallas Museum of Art's DMA Friends (http://www.dallasmuseumofart.org/Visit/Friends/). Launched in 2013 DMA Friends approaches membership as a program of engagement that is intended to build long-term relationships with visitors and to emphasize participation over traditional transaction-based membership models. Visitors can join the program using a web-based platform via iPad kiosks located in the museum space. After signing up as a Friend, visitors are presented with a series of possible activities which provide new ways to connect with the museum's programs and collections and, upon completion, visitors can earn digital badges.

[41] Many museums are utilising digital technology to aid visitor orientation and wayfinding as well as to offer specific multimedia tours within the museum. The Tate Modern multimedia tours (Proctor et al. 2003) use location tracking for personalised content delivery. The British Museum has recently launched a multimedia guide that supports way finding and orientation without relying on location aware technology (Filippini-Fantoni et al. 2011). The Exploratorium has undertaken numerous projects exploring digital technology within the museum space (Hsi 2003). The use of digital technologies in museums has tended to be focused around linear curatorial narratives, with little incentive

have been committed to the development of exhibitions and galleries in order to facilitate the engagement and enhance the experience of visitors. New tools and technologies have played an important role in this regard enabling museums to develop exhibits that facilitate interactivity and enable visitors to engage in more complex forms of participation in the museums and gallery space (Schiele and Koster 2000; vom Lehn and Heath 2005). The growth of research and development of digital technology to support learning (Taylor et al. 2006) has proved particularly important to museums. Research on visitor learning in museums suggests that interactivity promotes understanding, engagement, and recollection of objects and exhibitions (Allen 2004). This growing emphasis on the interactional and informal nature of learning in museums provides the perfect opportunity to showcase digital interactive technologies as important resources for engaging visitors in exhibits and more generally in museums as a whole (Thomas and Mintz 1998; Marty and Burton Jones 2008; Heath and vom Lehn. 2010). It has been suggested that digital devices can "immensely enrich visitors' enjoyment and learning in ways that would be extremely difficult if not impossible to provide through other media." (Gammon and Burch 2008, p.36). Nevertheless despite the growing interest in deploying digital technology as interpretation devices in

for visitors to create their own experiences. Only rarely have museum visitors been able to participate in creation or sharing of personal interpretations. Projects such as Bletchley Park Text (Mulholland et al. 2005) encouraged museum visitors to construct their own interpretation by sending text messages from specific exhibits; visitors could create a personalized web page which links their chosen topics in narrative threads. However these projects seem to hesitate in their approach to sharing individual interpretations with other visitors within the museum.

museums and galleries, and the substantial body of research concerned with visitor behaviour (section 2.3 focuses on visitor studies and engagement in museums which highlights the considerable body of literature on visitor behaviour), there are relatively few studies that examine how visitors, both alone and with others, use new technologies when exploring museum content. There is preliminary evidence that digital technology can increase engagement with museum collections (Proctor et al. 2003; Hsi 2003) and with the physical museum surroundings (Naismith et al. 2005) as well as increase visitor confidence, motivation and involvement (Burkett 2005). In general, however, to date, no empirical studies of museums utilising digital technology have been undertaken to look specifically at visitor generated content in the gallery space.

Digital technology has emerged as a major component of contemporary museum practice, playing an increasingly important part in all aspects of the museum; from exhibitions (vom Lehn and Heath 2005), education and outreach (Crow and Din 2009), reshaping marketing (Kotler et al. 2008) and audience development efforts, as well as producing new kinds of engagement and participation by audiences, both in-gallery (Tallon and Walker 2008) and online (Filippini Fantoni et al. 2012). These developments in museum practice have far reaching implications for the rationale, impact and future of museums that have yet to be considered systematically in the context of museological theory, epistemology and strategy. The International Conference on

Hypermedia and Interactivity in Museums (ICHIM)[42], the International Conference on Museums and the Web[43], Museum Computer Network (MCN)[44] and Museum Next[45], are going some way to extend the research interest in the discipline. Despite the growing body of critical thinking focusing on the impact digital technologies are having on theory in the museum field (Cameron and Kenderdine 2007; Parry 2010) concern has been raised by some researchers who stress that it is essential that the museum does not focus on the technology, which is not an end in itself (Lydecker 1993; Mintz 1991; Silberman and Purser 2012; Parry 2007). This has been recognised by a number of commentators such as Mintz (1991), and Silberman and Purser (2012, p.17) who advise that museums must be careful not to be seduced by the technology, and that museums should avoid the 'technology trap' (Sola 1997, p.225) by not pursuing technology for its own sake (Parry 2010, p.454).

One of the initial problems when discussing digital technologies in museums spaces is one of definition: what do museums mean when they use the term 'digital technology'? Any new medium tends to be

[42] http://www.archimuse.com/conferences/ichim.html ICHIM explored the legal, social, economic, technological, organisational and design concerns of digital culture and heritage, from the perspective of cultural policy makers, institutions and cultural participants. The ICHIM started in 1991 and ceased in 2007.
[43] http://www.museumsandtheweb.com/ Museums and the Web was founded in 1997 and has been held every year since then. The Museums and the Web conference is the largest international conference devoted to the exploration of art, science, natural and cultural heritage online.
[44] http://www.mcn.edu/ The Museum Computer Network was established in 1967, as an informal grouping of museums in the New York City area. The first MCN conference was held in 1979 and runs annually. The conference is dedicated to fostering the cultural aims of museums through the use of computer technologies.
[45] http://www.museumnext.org/ MuseumNext is a relatively new conference starting in 2009, this conference looks at how museums and galleries can benefit from new technology and the latest web trends.

disruptive of defined characteristics (Graham 2007, p.93), and the ever evolving characteristics of digital media in particular are inherently difficult to categorise by the museum sector. The history of digital technology in museums has included the namings of; 'ICT', 'virtual technology', 'interactive media', 'emergent media', 'new media' and 'digital media'. Each has a variable meaning in itself. Lev Manovich (2001) has even argued that the cultural sector is now 'post media' and the definitions and categories which best describe digital technology concern user behaviour and data organisation rather than the medium used (Manovich 2001). It is possible, however, to define digital technology by a couple of key features. Firstly its ability for infinite representations of data (Marty and Burton Jones 2008), highlighting that with the use of digital technology, museums no longer have the limitation of the physical dimension, and it is possible to display larger amounts of information and different perspectives or multiple readings of objects in little space and, more importantly, in different formats (text, image and sound). Interactivity is also a key feature of digital technology. Interactivity, can be regarded as the process with which users can have a first-person experience, in other words, explore, act upon, control, and even modify the environment (Roussou 2004, p.245). Studies conducted in both formal and informal environments (for a critical review see Economou and Pujol 2007) have proved that the active, self-controlled and collaborative exploration of digital contents indirectly benefits learning, especially in the case of complex, abstract or non-visible phenomena. Another feature corresponds to the

multiplicity of interfaces. Digital technology can take various forms and serve different communication purposes. Hasan Bakhshi and David Throsby in their Nesta report: *Culture of Innovation, An economic analysis of innovation in arts and cultural organizations* (2010) give a good functional overview of the sorts of things that museums consider in scope for digital technology:

> Nowadays, museums and galleries use new technologies for a range of functions both in the museum itself and on the web. In the physical museum, these functions include multimedia tours; interactive kiosks; simulation and virtual reality experiences; wireless connectivity enabling live feeds of information and tools; sound, laser and light shows; IMAX presentations and 'theme park-like' attractions. On the web, they include: online access to collections and databases; online exhibitions (text, image, audiovisual); virtual exhibitions (including 360-degree room views); virtual museums (including on Second Life), the use of real and imaginary exhibition and gallery spaces; downloadable and streamed multimedia content (audio, video, podcasts); interactive gallery maps; dedicated sites, games and play spaces for children and young people; personalised spaces – creating own favourites and tagging objects; use of social media networks (blogs, Facebook, Twitter, Flickr, YouTube); and shopping online (exhibition tickets, merchandise). Of course, many of these applications have been

> in existence for some time; however, their functionality is enhanced as the technology improves (Bakhshi and Throsby 2010, p.22).

Undoubtedly, digital technologies in museums have a wide set of characteristics; however the focal point of this thesis is to investigate digital visitor generated content, where this chapter's attention will now turn.

## 2.2 A SHIFT IN FOCUS: MUSEUMS AND VISITOR GENERATED CONTENT

Over the past thirty years, the nature and role of museums have undergone significant changes (Ballantyne and Uzzell 2011). Museums have embraced a gradual shift from an emphasis on objects and collections, to a focus on the visitor and their experience or, as Bayne et al. (2009) describe it, "a shift of focus away from object toward subject" (Bayne et al. 2009, p.111). Museum practice has evolved from a perception of the visitor as a passive spectator to that of an active participant (McLean 1999), and consistent with this visitor focused view is the rise of informal mass education within the "experience economy" (Pine and Gilmore 1999) which has radically altered the importance given to visitors' needs and experiences[46]. A "paradigm shift from collections-driven institutions to visitor-centred, museums has really taken hold" ( Anderson 2004, p.1). However to date, the majority

[46] Pine and Gilmore (1999), in their book *The Experience Economy: Work is theatre and every business is a stage*, argue that experiences are a new economic offering, as separate from services as services are from goods.

of museums have yet to adopt attitudes or organisational processes that are truly visitor-centred. Instead, a standard approach of visitor participation initiatives involves visitor surveys, feedback forms and focus groups, which rarely challenge established ideas (Zaccai 2012).

It is generally acknowledged that museums are experiencing a shift towards multi-directional, many-to many communication, with the result being a system modelled upon conversation and dialogue rather than broadcaster and consumption (Russo and Watkins 2008). Cultural organisations are no longer a physical platform for didactic transmission with limited interaction from visitors, restricting roles to that of the broadcaster and the receiver. This movement, which began in the 1970s, was very much characterised by a new reflexivity in museum practice (Ross 2004), and recognition of visitors as active meaning-makers. As Burton and Scott said in 2003, "the visitor is recognised as bringing a lived reality to the museum experience rather than the morally and intellectually blank slate assumed by museums in the late nineteenth and early twentieth centuries" (Burton and Scott 2003, p.65).

This shift in focus has enabled the development of new and innovative ways for visitors to participate actively in their own museum experience. Visitor generated content is one mechanism which is beginning to be used by museums.

### 2.2.1 CO-CREATION AND MUSEUMS

Cultural institutions have been dealing with access and participation for a long time[47]. However, recent changes in digital technologies and in modes of media consumption have changed the traditional cultural audiences (Tomka 2013, p.259). This in conjunction with the financial crisis[48] and significant cuts throughout the public sector, have put additional pressure on museums to justify their spending and their value to society. Consequently, museum professionals are urged to constantly look for new ways to engage their visitors and maintain their relevance.

There is a rising trend of co-creation[49] as a way of visitor engagement which reflects the evolving role of the visitor in a creative process. There is, however, a lack of clarity around what museums and cultural institutions mean by co-creation (Heywood 2008). Walmsley (2013) agrees and suggests an all-encompassing definition of co-creation remains elusive. Walmsley's work on co-creation in theatre did however highlight some interesting common traits of co-creation in the arts sector, namely "collaboration, agency, interaction, invention, experience, value and exchange" (Walmsley 2013, p.116). Brown et al. (2011) define co-creation as an activity where audience members

[47] Bishop (2006) argues that participatory practices are as old as the arts themselves, which have a long and proud tradition of "viewer participation" (Bishop 2006, p.78).
[48] During the last decade, the greatest funding impact has come from the financial crisis that hit in 2008 and became a recession that continues in 2013. Significant cuts have been established throughout the public sector, including to museums and to the bodies that distribute funds to them.
[49] Payne et al. (2008) identify three concrete factors behind the shift towards co-creation with visitors: technological breakthroughs; changes in industry logics; and changes in customer preferences and lifestyles.

"contribute something to an artistic experience curated by a professional artist" (Brown et al. 2011, p.15). This definition echoes Govier's (2009) description of co-creation as a "collaborative journey" that focuses on "working with our audiences (both existing and new) to create something together" (2009, p.3). Govier's focus on newness is also adopted by Ind et al. (2012), who define co-creation as "the interaction of individuals within a framework to evolve, re-define or invent something that is new" (Ind et al. 2012, p.7). However, co-creation does not always culminate in something new, and Leadbeater's (2009) more generic depiction of co-creation as "the art of with" (2009, p.5) therefore seems more appropriate for museum participation and co-creation with visitors.

It can be argued that co-creation represents a democratisation of museums (Byrd Phillips 2013) through a process in which content, authorship and authority are opened up to participant engagement. Specifically relevant is Hooper-Greenhill's vision of a democratised museum that "enables new voices to be heard" in order to critically reassess cultural narratives (Hooper-Greenhill 1999a, p.4). In recent years, co-creation and participation has been accompanied in the cultural heritage and arts sector by the growing popularity of interactive theatre, often referred to as immersive performance[50].

[50] For museums the comparisons with cutting edge theatre companies like Punchdrunk (punchdrunk.com) undoubtedly have much to add to the discussion of exhibition design and visitor experiences. There have been numerous authors in the museums sector have considered the impact of immersive theatre on museum experience (see Rodley 2013; Cairns 2013; Chan 2012). Museums and the Web 2013 (http://mw2013.museumsandtheweb.com/proposals/what-can-museums-learn-from-

Considering the dialogue surrounding these emerging participatory art forms and the impact of the social web, the lack of research into why visitors choose to engage with museums in a more participatory way, and the impact it has on their museum experience, is striking. This lack of research is not limited to museums, however, relatively little is known about how customers contribute to co-creation in general (Payne et al. 2008). Simon (2010) has gone some way to deal with this gap. Her book, *The Participatory Museum* presents a practical guide for museums who want to work with visitors to make more dynamic, relevant, and participatory experiences. Simon offers powerful maxims for thinking about creating successful participatory experiences in museums, and specifically focuses on co-creation with visitors. Nonetheless, there is a surprising paucity of literature on the act of co-creation itself. Brown et al. (2011) identify that despite discussions about visitor participation there is a lack of evaluation in this area; "missing in this debate is a dispassionate, critical assessment of the relative benefits and value of participatory arts practice versus receptive participation" (2011, p.10).[51] Understanding the impact of co-creation on visitor experience is essentially what is missing from both the research and practice of co-creation in museums. This concept is central to the research question posed in this thesis; namely that there is a challenge in understanding and articulating the impact of co-

immersive-theater/ ) held a keynote discussion focusing on what museums can learn from immersive theatre.

[51] A thorough investigation of the notion of value is out of scope here but for an example of the many indicators of cultural value that can be associated with that significant but problematic term, we can refer to Tanner's (2012) The Balanced Value Impact Model and Ottevanger's (2013) thesis on sustaining digital products in the museum sector.

creation in the museum environment therefore it is important to investigate how we can measure visitor engagement with digital co-creative systems in the museum space. Our concern here is with digital co-creation of content with visitors. With this in mind, we need a suitable phrase. Some commonly used terms have been rejected because they carry problematic associations; for instance; User Generated Content (UGC)[52] is often used in relation to online only content creation. Social Interpretation (the title project of two of our case studies) is often used to discuss content generated by museum visitors (Templeton 2013) but it in fact originates from sociology of cognition (Boodin 1914). For the purpose of this thesis the phrase used to discuss co-creation of content by visitors in the museum space: Visitor Generated Content. Our understanding of this phrase is where this chapter's attention will now turn.

### 2.2.2 VISITOR GENERATED CONTENT IN MUSEUMS

Museums have a long history of involving visitors in contributing content to museum collections and exhibitions, primarily as a means to gather feedback and assess effectiveness of their exhibitions through the use of visitor books[53], and feedback forms (Simon 2010). Museums occasionally invite visitors to enrich their collections with oral

[52] UGC refers to content generated by users on the Web, usually on social media platforms.
[53] The practice of keeping visitor books is longstanding, for example Findlen (1994) discusses the visitor books of Aldrovandi's museum (http://www.museopalazzopoggi.unibo.it/60/dettaglio_collezione/theulissealdrovandimuseum.html) in the late sixteenth century.

histories[54] and first-hand accounts of their experiences with objects[55]. Most recently museums are encouraging visitors to create their own experiences and interpretations of museum objects at a deeper level[56]. This notion of visitor-generated content has taken a new dimension with the advent of the social web (see footnote 4). Users of the social web increasingly expect to be actively involved in their own individual experiences rather than passively consuming content (Beer and Burrows 2007; Shirky 2009). The growth of social web technologies in the mid-2000s transformed participation from something limited and infrequent to something possible anytime, for anyone, anywhere (Simon 2010). In this new digital culture (as discussed earlier in 2.1.2), museum audiences are more connected, social and open to sharing than ever before. They are avid users of social media in their everyday lives and expect similar levels of and participation when engaging in cultural activities (Ross, Terras, et al. 2013; Leadbeater 2009); therefore it is becoming imperative for museums to investigate how the social web is used to engage audiences in cultural activities both online and on-site. Traditionally, cultural institutions have been extremely successful in inspiring and provoking debate, discussion and social exchange (Black

[54] The Portland Art Museum Object Stories (http://objectstories.org/) installation enabled visitors to record video stories about objects that matter to them.

[55] The Science Museum Object Wiki (http://objectwiki.sciencemuseum.org.uk/wiki/) and The British Postal Museum & Archive (BPMA) Wiki (http://www.postalheritage.org.uk/) both encouraged users to contribut their knowledge and experience with museum collections. The Science Museum object wiki aimed to engage users with objects, by encouraging them to add their personal memories and experiences of using the objects, and to enhance the information available about them. The BPMA wiki aim was to harness the knowledge of its audiences and improve access to the collections data. See Looseley & Roberto (2009).

[56] In 2009 the Powerhouse Museum (http://www.powerhousemuseum.com/) developed the The Odditoreum (the online version of the exhibition can be accessed at http://play.powerhousemuseum.com/play-and-interact/odditoreum/), an exhibition that reinterpreted objects and invited young visitors to write their own labels.

2010; Simon 2010). However, they tend to act as provocateurs, initiating discussions, but not actively participating, facilitating or representing them (See Hein (1998) for a discussion on didactic and discovery learning in museums). This is no longer accepted by audiences familiar with constant social engagement (Black 2005). The embedding of the social web or web 2.0, with the ideals of opening up, reaching out and letting go have caused museums to begin to experiment with the potentials participatory digital media could have for reaching and engaging visitors. Parry (2010, p.109) suggests that these web 2.0 ideals are consistent with the emerging practices, projects and philosophies of visitor participation in the museum. As Anderson notes, the advent of social computing has involved the transition "from an input-output era to that of a porous and continuous authoring environment, open to anyone regardless of background, education, or location" (Anderson 2007, p.294).

The role of technology as supporting visitor museum experiences is moving away from delivery of information towards enabling visitors to be directly involved in the shaping, and even creating the content of an exhibition[57]. Ciolfi et al. (2008) suggests this approach encourages

[57] McLean and Pollock's (2007) book Visitor Voices in Museum Exhibitions presents a good survey of ways museums are incorporating visitor contributed content in museum exhibitions and other media. Recent examples include the Tate (which has been running projects that invite visitors to the galleries and the website to contribute their own content for many years.) They have showcased visitor generated content in the gallery, such the Hello Cube (http://www.thehellocube.com/ ) where people could tweet instructions to an interactive installation at Tate Modern and create their own artworks, as well as an interactive comments wall in the new Tanks gallery asking visitors to participate. Tyne and Wear Museums and Newcastle University developed a participatory temporary exhibition entitled 'My Great North Run' where visitors could incorporate their personal experiences of the Great North Run into the exhibition. In 2010, the Wellcome Collection asked visitors

active reflection, discussion and appropriate and new tools and technologies have played an important role in this regard enabling museums to develop exhibits that facilitate interactivity and enable visitors to engage in more complex forms of participation in the museum space (Schiele and Koster 2000). A significant feature of such transformation involves, some argue, relinquishing some of the traditional control which cultural institutions have maintained for so long, in favour of playing an equal role in new partnerships and collaborations (MacGregor and Serota 2009; Simon 2010; Merritt 2011; Oomen and Aroyo 2011). Museums are gradually becoming more comfortable with the idea of visitors making a personal contribution to their collections, and more persuaded of the potential value and relevance of visitor generated content. Indeed, as practical issues concerning the storage and management of non-institutional material are becoming less problematic and procedures are put in place to coordinate and streamline visitor activity, a range of projects incorporating visitor generated content have been introduced. There have been a number of visitor generated content projects initiated in online museum spaces (see Trant et al. 2007; Ridge 2007; Durbin 2009; Russo and Peacock 2009; Ridge forthcoming. for examples). However, a problem which institutions have encountered is that the creation, implementation and sustainability of visitor generated content initiatives are hard to achieve. Creating an online community takes, as

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to donate objects to become co-creators of a temporary exhibition, 'Things' (http://www.wellcomecollection.org/whats-on/exhibitions/things.aspx).

Reynolds notes from a talk by Shelley Bernstein (Reynolds 2009), a lot of commitment and effort to realise; it needs, she suggests, authority, management buy-in, time and attention, and the willingness to change, rather than reproduce familiar patterns. Caruth and Bernstein (2007) argue that a new type of communication between institutions and users, based on dialogue rather than a transaction is required. Additionally there are institutional issues around control and authority. Durbin (2003) observes, that relinquishing control over content and processes continues to be somewhat problematic for institutions whose authority is defined in terms of authenticity and validation: "for museums, interactivity and participation throw up problems related to expertise. … As 'seekers after truth' can they allow inaccuracies to appear?" (Durbin 2003). Despite concerns about authenticity and authority, crowdsourcing projects in particular are being increasingly welcomed as a way of strengthening the relationship between institutions and their users, of improving the knowledge and the quality of the interpretation of collections, as well as potentially raising the profile of institutions beyond their traditional confines (Ridge 2007). In light of these developments, albeit mostly online developments, institutions are "reconsidering their relationship with users and the general public… both in the use of digital collections and how users can contribute to increasingly rich digital resource environments" (Terras 2011, p.687).

Notwithstanding this emergent shift in ethos to a more participatory visitor experience in online museum spaces, the development of museum technologies that enable and facilitate visitors to participate actively in shaping or creating and contributing to exhibition content has not been commonly applied within physical museum spaces. Sparacino et al. (2000) indicate that many new media installations, although employing novel input and output mechanisms that allow for some degree of innovative interaction, still work on the assumption of the broadcast model of communication where the museum provides information and the visitor receives it (Shannon and Weaver 1949). However, several examples of installations that are open to visitors' active participation have been deployed successfully. Heath et al. (Heath et al. 2002) and Hindmarsh et al. (2002) have discussed in detail the ecologies of participation surrounding low-tech exhibits of which visitors can visually become part, such as 'Deus Oculi' at the Chelsea Crafts Fair (Heath et al. 2002) and 'Ghost Ship' at the Sculpture, Objects and Functional Art (SOFA) Exposition in Chicago (Hindmarsh et al. 2002). The main goal of these exhibits was to encourage and engender episodes of social interaction and communication around an exhibit, making the visitors part of the exhibit itself, and thus drawing the interest of companions and onlookers. Most recently Cleveland Museum of Art's Gallery One[58] is transforming how museums can incorporate visitors' active participation in gallery spaces. Gallery One opened to tremendous acclaim and fanfare (Rodley 2013). A range of

[58] http://www.clevelandart.org/gallery-one

digital interactives throughout the gallery space offer opportunities for visitors to participate, including a Collection Wall; ArtLens participatory iPad app; a Studio Play area designed specifically for children; as well as six interactive Lense displays (Alexander et al. 2013). This innovative gallery blends art, technology, and interpretation to inspire visitors to explore the museum's permanent collection. Gallery One is, to date, the only non-science gallery which main focus is to use innovative technology to shift the visitor experience to emphasize engagement, curiosity and creativity.

It appears that an approach that is open to visitor contributions is more often adopted when designing exhibits in the context of hands-on museums, such as exploratoria and science centres, and it is found less commonly in 'traditional' museums focusing on history, art and natural history. The main issue surrounding the introduction of such an open approach in this context is one of authorship; traditionally, museums are considered as institutions of authority, where experts provide information and visitors receive that information.[59] This means that the interpretation of a certain object on display is decided in advance by the curatorial team, thus the narrative that is presented to visitors is not really open to challenges or external contributions. This contrasts with certain other areas, for example interactive art, which has produced interesting reflections on collaborative practices in designing

[59] Historically, the broadcast communication model provided the framework for authoritative knowledge as provided by the museum. This has traditionally placed museums as provider of both authoritative and authentic knowledge (Russo et al. 2008; Thomas 1998).

exhibitions, and on authorship issues (Diamond 2005), embodied in pieces that are designed explicitly to create active visitor engagement (Giaccardi 2005). This approach, however, is seldom found in more historical based museums. Therefore despite cultural institutions increasingly adopting technology to incorporate user-contributed and visitor-generated content into exhibitions and displays there have been no in depth investigations undertaken to look specifically at visitor-generated content.

### 2.2.3 RADICAL TRUST

Radical Trust is an important concept to consider when thinking about the use of visitor generated content in museum spaces. As we have mentioned previously the notion of co-creation and visitor generated content arguably represents a democratisation of museums (Byrd Phillips 2013) through a process in which content, authorship and authority are opened up to participant engagement. Museum visitors now expect to be actively involved in their own individual experiences rather than passively consuming content (Beer and Burrows 2007; Shirky 2009). Changing user expectations challenge museums to direct their efforts in new directions, forcing museums to make fundamental decisions about the nature of authority, openness and trust. It is becoming more apparent that in order for museums to meet visitors expectations of being participatory, 'democratised' spaces (Byrd

Phillips 2013; Hooper-Greenhill 1999b, p.4), museums must develop a new form of trust (Marstine 2013; Lynch and Alberti 2010; Lynch 2013a). Lynch and Alberti (2010) in their work about racism and prejudice in museums suggest that radical trust is necessary in order for museums to genuinely to collaborate with visitors. This radical trust is based on the idea that shared authority is more effective at creating and guiding culture than institutional control (Lynch and Alberti 2010). Radical trust as a concept and a practice is widely used online in user-generated content, particularly by libraries (Fichter 2006), and has been successfully applied to museum blogging (Spadaccini and Chan 2007). Lynch and Alberti (2010) go on to suggest that radical trust should be used in physical museum spaces (ibid., p. 15) by adapting collaborative engagement to enable responses and interpretations from multiple sources, supporting Hooper-Greenhill's vision of a democratised museum that "enables new voices to be heard" (Hooper-Greenhill 1999a, p.4). However, the practice of radical trust in gallery spaces is not without its problems, as it raised challenges to traditional forms of authority and authenticity (Simon 2010; Merritt 2011; Oomen and Aroyo 2011). It is important to consider that the process of radical trust is inevitably going to create new spheres of conflict and potential resistance, as Lynch (2013b) suggests practicing radical trust is an ultimate goal for museums but it "remains somewhat out of reach, however, as resistance to change continues to be entrenched in the museum institution" (Lynch 2013b, p.222).

The research in this thesis draws inspiration from Lynch and Alberti work on radical trust and looks to understand if practicing radical trust in relation to digital visitor generated content is a meaningful way for museums to genuinely collaborate with their visitors and if this has an impact on visitor engagement

### 2.2.4 UNDERSTANDING VISITOR COMMENTS

This research aims to explore how visitor generated content and digital innovation in museums are impacting on visitor engagement. There is a long history of museum audience research which demonstrates the interest museums have had in their visitors over time (Gilman 1923; Loomis 1987; Hein 1998; Black 2005), however there have been very few studies into the effectiveness of digital technologies (Falk and Dierking 2008) and the impact they have on visitor engagement. One of the key concerns in this research, and indeed, contemporary museum studies as a whole, is that of accessing the audience perspective. Theoretical developments in cultural and museum studies have put new emphasis on the process of active meaning-making (Silverman 1995; Falk and Dierking 2000) rather than primarily as a reflex of production (Miller 1995). This idea of the visitor-centred museum (Anderson 2004) is also paralleled in the rise in the number of participatory media technologies pervading daily life enabling large numbers of users to create content using a variety of tools, bringing about changes in the ways communities interact, socialize and

collaborate. In particular, social media and digital technologies accord users new levels of authority, and construction of knowledge which mean that their views need to be gathered and taken into account (Russo and Watkins 2008). Research on museum visitors has grown rapidly and a wide range of methodologies have been employed to try to find ways to access visitor understandings of, and responses to, museums and specific elements of exhibitions (Diamond 1999; Dierking and Pollock 1998; Hooper-Greenhill 2009). One source that has been relatively little used, however, is actually that of the museum visitor, whether that is the museum visitor book (Macdonald 2005) or a digital interactive with visitor input. The methodological challenge for this thesis, therefore, is to explore the potential advantages and drawbacks of using museum visitor contributions as a source of information on visitor engagement with museum content and the impact of digital technology on the museum experience.

Many museums use visitor books, comment cards and feedback forms to capture the opinions and experiences of visitors. They are, however, rarely utilised to research and fully understand visitor experience. As Pekarik (1997) points out, while visitors may welcome the opportunity to write and respond to comments, many museums however do not have the time or resource to read and react to them, and worse, ‘‘an isolated eloquent negative or positive comment can easily lead to misinterpretation or misunderstanding of the overall audience response’’ (Pekarik 1997, p.56). Coffee (2013) suggests that

visitor comment books are an under used and under analysed resource in the museum literature. He goes on to suggest that this is not an unsolvable problem, "only a thorny one" (Coffee 2013, p.166). Several authors have contributed analyses of visitor comments (Worts 1995; Pekarik 1997; Livingstone et al. 2001; Macdonald 2005; Reid 2005; Nys 2009; Coffee 2011; Coffee 2013) but none, to date, have focused on digital visitor generated content in museum spaces.

Worts (1995) looked at 5,000 cards left in response to the works displayed in the historical Canadian art hall of the Art Gallery of Ontario[60]. In this case, the comment cards were blank card imprinted with the invitation: ''Share your Reaction''. Most respondents left drawn rather than written responses. Although the specific methodology is not detailed, it would appear that staff then looked at the cards with the goal of improving their knowledge of variations in visitor experiences in exhibitions. Worts concludes that the ''range of responses is quite remarkable—and they display a kind of personal insight into the art experience that the Gallery itself could not articulate'' (Worts 1995, p.175). Macdonald (2005) explores the potential of museum visitor books as a research resource for providing insights and information about audience views, experiences and understandings. Drawing from her work on visitor books in the Documentation Centre in Nuremberg, Macdonald (2005) considers the potential, and to date relatively unexplored, value of the ubiquitous museum visitor book which, she argues, for some exhibitions at least, may be the only available source of

[60] http://www.ago.net/

information about visitors' experience. She argues that visitor books, the product of multiple authors differ from most other sources as they are produced independently of ongoing research and thus might be considered as active inscriptions of visitor interpretation and could provide access to aspects of visitor meaning-making and individual experience. In contrast, Reid (2005) argues that, in restrictive political climates, visitor comment books cannot be candid records of what visitors really think, but concedes that even then they become battlegrounds of 'taste war (and) class war' (Reid 2005). Conversely, Livingstone et al. (2001) have explored how to quantify the information captured in thousands of comment cards as 'statistically valid' summaries of audience opinion (Livingstone et al. 2001). Coffee (2011; 2013) has the same opinion and argues that comment books are an important dialogic activity in which social discourse takes shape and that analysis of this dynamic highlights how narrative co-creation (see section 2.2.2) acts as an important social function of museums.

Visitor generated content presents enormous opportunities for museums to empower visitors to develop, create and engage on a deeper level with museum content. Visitor generated content, however, also presents challenges for the stakeholders involved in the design process to achieve a balance between what is considered meaningful curated content with more open social platforms that encourage active participation. Furthermore, digitally-mediated participatory installations continue to occupy the ambiguous space between audience

engagement and exhibition interpretation, with an impact on both how visitor generated content is collected and archived by institutions and also how displays facilitating visitor generated content fit with existing exhibition interpretation. There are also concerns relating to the usability, usefulness and educational value of digital technology interventions in museums, both regarding the design and production of these tools and the evaluation of their use by museum visitors (Marti 2001; Grinter et al. 2002; Ciolfi et al. 2008). Several issues surrounding the problematic nature of overlaying digital content on museum objects have also been discussed, including the impact on the social nature of the museum visit (vom Lehn et al. 2001; Galani 2005), the educational value of the installations (Hall and Bannon 2006; Ott and Pozzi 2011) and their potential to support engagement and flow (Giaccardi 2005). In other words, besides ensuring that certain technological interventions respond to specific design guidelines both in terms of physical and of interface design, it is also necessary to reflect upon how technology impacts on the museum experience as a whole.

## 2.3 VISITOR STUDIES AND ENGAGEMENT IN MUSEUMS

This section of the literature review focuses on museum visitor behaviour in order to provide a basis for understanding the research context; to identify key areas in which to focus the investigation and to aid in the development of appropriate research methods. The research

methods for this thesis focuses intently on the engagement and actions of the visitor therefore it is important to consider the literature surrounding visitor studies and levels of engagement in the museum space. This section is divided into four sections: The first section looks at the themes of cognition and the context of behaviour are introduced and developed through a review of approaches that have been influential in studying museum visitor behaviour. In the second section, the concept of meaning-making in museums is examined in order to provide a context to effectively investigate visitor engagement, interaction value and behavioural characteristics of the digital museum content environment. The following section briefly looks at visitor engagement and participatory culture and goes on to provide a definition of engagement used in this study. The final section looks at the challenges of investigating the less tangible or easily measured outcomes of impact on museum visitors.

### 2.3.1 RESEARCHING MUSEUM VISITORS

The aim of this section is to provide an overview of some of the main directions in museum audience research and visitor studies, especially where paradigmatic shifts in view towards a consideration of visitors as meaning-makers may be situated. Thus, this section examines meaning-making in museum audience research.

According to Macdonald (2005), systematic efforts to gather information about museum audiences, and accompanying debates about the most appropriate methods for doing so - collectively described as 'museum visitor studies' - have grown considerably over the last twenty years (*ibid*, p.120). She argues that the field of museum visitor studies has drawn from a range of disciplines, including psychology, sociology, anthropology, literary and art criticism, and media studies (*ibid.*). In the course of its development, the conceptualisation of the museum visitor has shifted from passive receiver of messages to active learner and interpreter. Hooper-Greenhill (2006) sets out the key elements of this field of study as including: "large scale studies of social participation, museum visitor surveys, and studies of visitor responses to museum exhibitions and other events. An enduring concern with the character of museum education and learning can be identified, but definitions of what counts as learning remains fluid." (Hooper-Greenhill 2006, p.374). She identifies "several loosely interlocking intellectual journeys together with a shift from: ... considering museum visitors as an undifferentiated mass public to beginning to accept visitors as active interpreters and performers of meaning-making practices within complex cultural sites" (*ibid,* p.362) This has been paralleled by a change in theoretical approach from "a narrow, backward-looking paradigm based on behaviourist psychology and a transmission or expert-to-novice model of communication to a more open and forward-looking interpretive paradigm that employs a cultural view of communication involving the

negotiation of meaning." (*ibid.*). In part, this was precipitated by Lawrence (1993) who challenged museum researchers and practitioners to acknowledge the positivist theoretical underpinnings of (then) existing museum studies methods such as behavioural observation, structured questionnaires and interviews. However, according to Hooper-Greenhill, there are still relatively few studies that go beyond assessing whether or not people 'got the message' towards exploring the ways in which visitors code and recode their museum experience (Hooper-Greenhill 2006). Both Shelton (2006) and Hooper-Greenhill (2006) point to the gradual development of research, such as Macdonald's (2002) ethnographic study in the Science Museum, characterised by "sophistication, focus of the research questions and depth of analysis, which uses the explanatory power of cultural theory" (Hooper-Greenhill 2011, p.373). This kind of ethnographic approach, according to Hooper-Greenhill, allows visitors to be understood "within the contestations and ambitions that characterized the development of the exhibition itself" (*ibid.*).

### 2.3.2 MUSEUM NARRATIVES AND VISITOR MEANING-MAKING

Visitor meaning-making has been a dynamic research theme in museum studies for over a twenty years (Silverman 1995; Hooper-Greenhill 2000). The concept of meaning-making provides an approach to understanding visitor experiences, highlighting the active role visitors'

play in creating personal meaning from the museum experience. Individuals ctively construct sense and make meaning for themselves through deploying their existing knowledge in interpreting new experiences (Bruner 1996; Shank 1990). Many museums now accept the 'constructivist' view that knowledge is actively produced by a visitor and focus not on individual learning but what the museum contributes to existing knowledge and experience (Hein 1999; Deeth 2012). Hein (1999) states that each visitor has their own agenda, identity, motivation and interests and will approach the museum with different perspectives (Hein 1999, pp.77–78). As a result, visitors will find their own personal significance within museums (Falk and Dierking 2000, p.41). Meaning making in museums is a joint, social, situated and cumulative process through which visitor(s) and context are in a constant interchange in order to create meaning (Falk and Dierking 2000; Rowe 2002; Rahm 2004). "Meaning-making is… what visitors inevitably do in museums" Hein (1999, p.15). This growing emphasis on the interactional and informal nature of learning, meaning-making and visitor experience in museums provides the perfect opportunity to showcase digital interactive technologies and visitor generated content as important resources for engaging visitors in exhibits and more generally in museums as a whole (Thomas and Mintz 1998; Marty and Burton Jones 2007; Heath and vom Lehn 2010).

The use of narrative in museums has long been recognised as meaning-making tool and a powerful communication technique to engage

visitors and to explore the different kinds of learning and participation that result (McLellan 2006). It has been suggested that:

> Every museum visitor is a storyteller with authority. Every evocative object on exhibit is a mnemonic device. Every visitor interaction is story-making as visitors fit portions of our collections into personal frames of reference; most often in ways we neither intended nor anticipated (Archibald 2006).

Digital media have produced possibilities for the construction, transmission, retransmission and transformation of personal stories (Couldry 2008). Digital storytelling has attracted attention for its ability to allow individuals to reflect and create their own meaning (Ruston and Stein 2005; Hull and Katz 2006; Walker 2008). Nevertheless, digital technologies, specifically mobile media, have rarely been used by museums to facilitate collaborative construction of narrative and meaning-making. There is preliminary evidence that digital technology can increase engagement with museum collections (Proctor et al. 2003; Hsi 2003) and with the physical museum surroundings (Naismith et al. 2005) as well as increase visitor confidence, motivation and involvement (Burkett 2005). However to date no empirical studies of museums utilising digital technology have been undertaken to look specifically at visitor experiences and meaning-making characteristics.

### 2.3.3 VISITOR ENGAGEMENT AND PARTICIPATORY CULTURE

Recent years have seen increasingly nuanced conceptualisations of the museum experience and how elements of museums promote particular forms of visitor engagement. In particular visitor engagement and participatory culture have garnered a lot of attention in the field of museums. There are lots of discussions in the current literature about the nature of engagement and participation in museums (Simon 2010; Richardson 2011; Stein 2012; Mack et al. 2012). However vom Lehn et al. (2005), vom Lehn and Heath and Davies and Heath (2013) contend that little research has been undertaken with reference to visitors' interaction in the physical museum space at the 'exhibit-face'; therefore there is little knowledge available on concrete examples of how visitors draw on resources provided by museums and their own experience to augment engagement with museum content. Previous research in the physical context of museums is mainly focused on the layout of exhibitions, the positioning of interpretation labels, quantitative measures of visitor attendance and dwell times (Bitgood et al. 1994; Serrell 1997; Falk and Storksdieck 2005). However, measurement of levels of interactivity and engagement within museum spaces has not been deservedly researched. Despite the majority of visitor studies relying on observational measures of engagement, as far as the author is aware, no adequate engagement benchmarks exist in terms of in gallery digital visitor generated content technologies.

The concept of engagement can be identified throughout a number of disciplines spanning consumer psychology, marketing, education, and cultural heritage, with multiple, though related, definitions (see for example Kearsley and Shneiderman 1998; Welsh 2005; Higgins, T. 2006; Bilda et al. 2008; Mollen and Wilson 2010; Hollebeek 2011). The meaning of engagement is, however, context specific, giving rise to potential variations in the interpretation of the concept (Little and Little 2006). In the field of social psychology, Achterberg et al. (2003) describe engagement as "a sense of initiative, involvement and adequate response to social stimuli, participate in social activities and interact with other[s]" (Achterberg et al. 2003, p.213). Engagement has also been conceptualised as a state of sustained attention which can be characterised as "... a state of being involved, occupied, fully absorbed, or engrossed in something sustained attention" (Higgins and Scholer 2009, p.102). The concept of engagement is in agreement with other ideas describing visitor interest, including involvement, flow and interactivity (Csikszentmihalyi 2008; Mollen and Wilson 2010; Abdul-Ghani et al. 2011). In museum studies, engagement is inextricably linked with museum experience. Falk and Dierking (1992) introduced the Interactive Experience Model later renamed the Contextual Model of Learning (Falk and Dierking 2000), a framework stemming from constructivism, cognitive and sociocultural theories of learning (Falk and Storksdieck 2005). The Contextual Model of Learning argues that learning in the museum experience is contextualised at all times. According to the framework, the museum experience is a complex and

interactional phenomenon situated in three contexts: the personal, the sociocultural, and the physical (Falk and Dierking 2000). By presenting an integrated framework, Falk and Dierking highlight the interplay between the personal, social, and physical context in relation to the museum experience. This acknowledges the interactions and collaborations emerging during the museum visit by including them in its social context and highlights the active role visitors' play in their own museum experience. It is useful to consider this framework when considering how digital innovation may affect engagement and visitor experience in the gallery space, as it will undoubtedly impact on the physical and social context of the museum visit. Additionally, Edmonds et al. (2006), identify four categories of engagement between art exhibits and the viewer; namely static, dynamic-passive, dynamic-interactive and varying (Table 2). These effectively represent a hierarchy of level of engagement which can be drawn on to identify skills and knowledge that visitors may require in engaging with the different types of exhibit.

| | |
|---|---|
| Static | This category refers to unchangeable art objects and the art consumer may be experiencing emotional reactions with artefacts. |
| Dynamic-passive | This category refers to visitors with a passive observation of art activity in response to the physical environment such as sound or light. |
| Dynamic-interactive | This category refers to visitors who are experiencing dynamic-passive characteristics as well as interacting and playing with technological engagement facilities such as installed screens in museums. |
| Varying | This category refers to a mixture of both dynamic-passive and dynamic-interactive engagement as well as a history of interactions with the place or technology. |

Table 2: Categories of engagement between art exhibits and the viewer. The table illustrates Edmonds et al.'s (2006, p.310-311) classification that museum visitors might require in order to achieve a high level of engagement with an museum exhibit.

As museums evolve and adopt more engagement based methods of delivering information to their visitors, it is important to focus on how the measures and models are being used to capture and evaluate visitor engagement (Kotler et al. 2008). For the purpose of this study, the concept of engagement is defined as the level and type of interaction and involvement that visitors willingly undertake in consuming and contributing to museum content and is taken to mean a combination of attention, enjoyment, appeal and implied learning (Falk and Dierking 1992; S Allen 2002; J. Falk and Dierking 2008; Vavoula and Sharples 2009; Elliston and FitzGerald 2012).

### 2.3.4 INVESTIGATING AND MEASURING THE INTANGIBLE

> Measuring and articulating the value and impact of the sector is more than an academic exercise: given the policy, financial and business structures in which most cultural organizations operate in England, rightly selecting, rigorously measuring and powerfully articulating the value and impact of the sector is one of the key pre-requisites for its sustainability (Stanziola 2008, p.317).

Stanziola's call to action may be discussing museums and the cultural sector as a whole, but the same applies to the development and evaluation of museum digital technology projects. There is a need to address the 'use', 'value' and 'impact' of digital technology in the context of an expanding mass of cultural heritage digital content which is believed to have tremendous potential for public engagement. Today more than ever museums are asked by government to justify their funding in terms of the social and economic outcomes they deliver to society. The global economic downturn that began in 2007 has led to serious cuts in funding for almost all cultural heritage initiatives, including the development of, and support for, digital collections and technological innovation. Specifically in the UK, the threats to funding have become a reality, with the closure of the Museums, Libraries and Archives Council (MLA), cuts to the Arts Council, and to Research Council funding overall (Hughes 2012, p.2). A survey undertaken by the Museums Association highlighted that due to funding cuts a fifth of UK

museums have been cut by 25% or more (Newman and Tourle 2011). Partly as a consequence of the reduction in funding, there has been a sharper emphasis on the need to demonstrate the impact of publicly funded resources and research, as a means of quantifying the value of the investment to all stakeholders. Funding agencies and research councils, notably the Arts and Humanities Research Council (AHRC) in the UK, have placed an increasing emphasis on 'impact' and 'evidence of value' of all research that they fund (AHRC 2006; AHRC 2009; AHRC 2013). Additionally the Browne Review (Browne 2010), which focused on Higher Education, has called for evidence of the 'value' of the arts and humanities to society. In this environment of impact evidence and value there is increasing pressure for cultural heritage institutions and research bodies to demonstrate economic and social impact, despite the fact that the 'economic benefit of the arts and humanities' is a topic for which there is little hard evidence at this time (Hughes 2012).

Museums have had to progressively prove their worth to maintain funding. However this has been more to do with evaluating services in terms of outcomes, whereas there is a lack of impact measurements for the less tangible or easily measured outcomes of impact on visitors. A number of academic studies have been carried out in the UK to investigate the value and impact of library and information services (Brophy 2006; Bawden et al. 2009; Marshall 2011) and there is a call for evaluation to be undertaken at the end of funded projects throughout the cultural heritage sector. Given the current economic

climate, and the pressure on funding for digital collections, addressing these issues is crucial in order to make the case for protecting existing digital heritage, and for increased digitization and digital innovation. New digital projects must have compelling and visible impact.

Attempting to address the notion of engagement of digital technology and visitor generated content in museums, it is easy to assume that what is trying to be identified is an already defined concept. Impact evaluation is however a complex issue, not helped by the fact that definitions are still being determined and understood by the cultural heritage sector. While there is an abundance of anecdotal evidence and descriptions of best practice in the sector, extensive hard evidence of impact, gathered systematically, is often lacking. The concern is expressed that, in a climate where funding bodies are expecting museums to demonstrate impact and value, museums are not providing the evidence of their contribution.

Since the 1980s, museum value has been assessed based on evidence of reducing social exclusion (DCMS 2000; Hooper-Greenhill et al. 2000), contributing to the economy (Travers 2006) and adding to the development of social capital (Kinghorn and Willis 2008) in communities. Many impact studies of museum and cultural activities overstate their measurable economic values but ignore the intangible impacts and values that they generate. Bakhshi and Throsby (2010) believe that "Fresh thinking is needed on how to articulate and, where possible, measure, the full range of benefits that arise from the work of

arts and cultural organisations" (Bakhshi and Throsby 2010, p.58) However, this is very difficult to do as cultural impacts are often intangible, hard to explain and prove (Wavell et al. 2002). It can be argued that any institution which creates an experience creates more outputs that economic and numerical ones. Visitor experience and engagement can't be measured by instrumental values alone. There is an increasing shift towards digitisation and digital access to collections which will further extend the debate regarding users, value and impact. As more collections are made available via digital technologies, the number of beneficiaries will increase and the ability of the sector to track and trace benefits and end uses of visitor engagement with collections will become increasingly challenging.

How do you measure the immeasurable? Is it possible to identify intangible impact in museums, particularly focusing on digital technology? Selwood (2010) suggests there are various ways of ascertaining, if not assessing, museums' overall impact, other than by economic value. These include: direct consultation to assess public value (Keaney 2006, p.41; Holden and Baltà 2012); self-evaluations, peer and user-review; and stakeholder analysis. Indeed, an increasing body of work is being developed around such approaches. But, to date, this has largely relied on peer and specialist review, which draws on small, professional networks rather than end-users. This in addition to recent research (Tanner 2012b) into the value and impact of digitised collections has shown that there is a serious lack of adequate means to

assess impact in the cultural heritage sector and thus a lack of significant evidence beyond the anecdotal, metric or evaluations of outputs rather than outcomes. In short, we need better evidence of impact. In order to focus on the digital technology and innovation aspects of museum impact, the purpose of this thesis is to focus on intangible impact of digital innovation projects in museums from the perspective of visitor engagement and from the perspective of organisational change.

There is some debate on the appropriate methods to measure intangible impact in museums. There is even debate over the terminology used; whether it should be classed as 'measurement', 'evaluation' or 'assessment' (Wavell et al. 2002). Definitions of intangible impact have proved problematic and different interpretations have been identified during the literature review, but in the context of this chapter there is a clear need to explore methodological approaches for measuring and evaluating use of digital museum content, specifically focusing on whether impact relating to digital technology can be measured adequately.

## 2.4 DIGITAL INNOVATION AND MUSEUMS

It became apparent during the research process, the development of the QRator and Social Interpretation projects and data collection for the case studies, that an understanding of digital innovation, research and

development and institutional change management was required. As discussed earlier the creation of the digital applications and the impact they have on their environment is considered hugely important to digital humanities research. In addition there is a lot of concern in the digital humanities discipline about making and creating digital applications, but not nearly enough about the effect on users and the broader context (Warwick 2012). Thus this research hopes to add to these debates by not only understanding the creation, implementation and evaluation of digital applications but also undertaking research that tends to be neglected- reflecting on use, context and effects. Therefore the literature on digital innovation needs to be understood to place this in context of museums.

Although there is a growing recognition of the importance of R&D in cultural institutions, research on the development of these resources is still scarce. Studies on these topics tend to focus on financial resources and capabilities on the growth of other industries and disciplines, particularly science and technology. Hasan Bakhshi (2012) stated that: "Unlike science and technology, very little is known about how R&D [Research and Development] is managed by cultural institutions, how it should be evaluated, and how well the knowledge created through R&D diffuses (or not) across organisations" (Bakhshi 2012). With this in mind, this section of the literature review tackles the overarching theme of exploring what digital innovation and R&D is in a museum context, and what key initiatives have already taken place.

### 2.4.1 DIGITAL TECHNOLOGY AS A CATALYST FOR CHANGE?

Museums are operating within a rapidly evolving environment of profound change. This change, despite the preconception, is not new; as for more than a century, museums have been continuously evolving and undergoing re-invention (Dana 1917; Gail Anderson 2004; Weil 1990; Janes 2013); What is new, is the pace of change: museums and other cultural institutions are facing the challenges of the accelerating pace of technology-driven changes in society (Stein 2012). More rapidly than ever, digital technology and participatory applications are changing the way society works, learns, and interacts. Due to this ubiquitous technological revolution the European Commission as early as 2002 described museums to be at a point of transition, "a technology-driven mutation" (European Commission 2002, p.9) in the evolution of the cultural heritage sector which will redefine the sector and blur institutional boundaries (Knell 2010, p.436). Stein (2012) agrees as he believes that technology is a catalyst for changes in museums. Parry (2010) goes on to assert that digital technology has been "catalytic, significant and lasting… new digital technologies appear always to be at the heart of this change" (Parry 2010, p.140).

This 'change' not only focusses on the institution but also the changing nature of visitor consumption. The digital literacy[61] of the UK's general

[61] In the UK, discussion about 'digital literacy' exists both in official reports and online, however the main focus around forms of literacy is referred to most often as 'media literacy'(Belshaw 2011). There are a number of existing sources of data on people's use and non-use of the internet including the Office for National Statistics http://www.ons.gov.uk/ons/rel/rdit2/internet-access-quarterly-update/q3-2013/stb-ia-q3-

public, and in particular its familiarity with the internet, has developed rapidly since the mid-1990s. Digital technology and media have infiltrated mainstream culture deeply, if not completely, and cultural audiences are more connected, social and open to sharing than ever before. Increasingly, they use digital media in their personal lives and expect similar levels of access and participation when engaging in cultural activities (Ross, Terras, et al. 2013). There is an underlying argument here that people increasingly live in a 'digital culture' (Gere 2002, p.7). In his book, *Digital Culture* (2002), Gere articulates the extent to which our everyday lives are becoming dominated by digital technology, and how these technologies are in the process of changing us and our relationship with our environment (Gere 2002)[62]. In 2013, 83% of households in Great Britain had Internet access and 53% of internet users accessed the internet using a mobile phone (Office of National Statistics 2013) – this figure has more than doubled between 2010 and 2013, from 24% to 53%. Due to this digital revolution museum consumption and visiting patterns are being radically re-shaped (Bakhshi and Throsby 2010) and digital technology is seen as a primary driver of change in consumer behaviour (Molteni and Ordenini

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2013.html , Oxford Internet Survey http://oxis.oii.ox.ac.uk/ , Ofcom UK Media Literacy Reports http://stakeholders.ofcom.org.uk/market-data-research/media-literacy-pubs/ , and the BBC Media Literacy: Understanding Digital Capabilities report http://downloads.bbc.co.uk/learning/learningoverview/bbcmedialiteracy_26072012.pdf.

[62] In his introduction to Digital Culture, Gere (2002) provides examples of how during the last twenty years, digital technology has begun to touch on almost every aspect of society. For example, all forms of mass media, television, recorded music and film are produced and distributed digitally; and these media are now converging with digital forms, such as the internet, and video games, to produce a seamless digital media landscape (*ibid*, p.13-14). Gere goes on to highlight that when at work we are surrounded by technology, whether in offices or in supermarkets and factories, where almost every aspect of planning, design, marketing, production and distribution is monitored or controlled digitally (*ibid*, p.14).

2003; Bakhshi and Throsby 2012) forcing cultural organisations to rethink how they engage their audiences. Cultural institutions now require new frameworks and models to engage audiences in ways which are acceptable to them (Russo and Watkins 2008). Faced with such pressures, innovation is viewed by many institutions as critical to their future success (Bakhshi and Throsby 2010; Vicente et al. 2012; Bakhshi and Throsby 2012). In particular emphasis is being put on how museums can use innovative digital technologies to expand and deepen their relationships with audiences.

The following section attempts to define what digital innovation means to museums. This is followed by an examination of what is already known about the changing nature of the museum environment in light of digital innovation.

### 2.4.2 WHAT DOES INNOVATION MEAN TO MUSEUMS?

Traditionally, studies on and definitions of innovation have assumed it to be of a business, economic, functional, scientific or technological nature, reflected by Schumpeter's (1934) five types of innovation:

- Introduction of new product or a qualitative change in an existing product
- Process innovation new to an industry
- The opening of a new market

- Development of new sources of supply for raw materials or other inputs
- Changes in organisation (Schumpeter 1934, p.66)

But it is now widely acknowledged that innovation is much broader than this; as Damanpour and Schneider (2006, p.216) state: "Innovation is studied in many disciplines and has been defined from different perspectives". This however can be perceived as detrimental, as early as 1984, Ettlie et al. (1984) commented on the problems for innovation research and practice arising for a disciplinary void. Both Zairi (1994) and Cooper (1998) have suggested that one of the challenges of innovation is the lack of a common definition, leading Adams et al. (2006, p.22) to suggest that a general definition adaptable to different disciplines and covering different aspects of innovation would be beneficial. In addition to the lack of a generic definition of innovation, Baskhsi and Throsby (2010) go on to state that traditional measures ignore innovations in sectors such as services which account for a dominant and increasing share of overall economic activity (DTI 2007; Abreu et al. 2008). Miles and Green (2008) agree and indicate that there is a high level of innovative activity in the UK's creative industries which are 'hidden' from traditional measures of innovation.

Despite the UK being described as an 'innovation nation' (DIUS 2008) and an increasing number of studies focusing on innovative behaviours in the creative industries (Handke 2008; Miles and Green 2008; Potts et al. 2008), and the DIUS (2008) concluding that innovation can be

defined as; “the successful exploitation of new ideas, which can mean new to a company, organisation, industry or sector. It applies to products, services, business processes and models, marketing and enabling technologies” (2008, p.15), very little is known about innovation focusing specifically on museums and the cultural heritage sector.

In an attempt to bridge the gap of cultural heritage innovation research Baskhsi and Throsby (2010, p.13) developed a useful working definition of innovation by identifying four categories which are common to innovation in cultural institutions (Table 3):

| | |
|---|---|
| **Innovation in audience reach** | Innovation in audience reach relates to the generation of new audiences, including through use of digital technologies such as providing online access to collections in art galleries and museums. Cultural institutions may also innovate in the depth of their engagement with audiences, for example by using knowledge resources online which enhance the audience’s experience of artworks, by interacting with audiences on social networks, or by providing opportunities presented by digital technology for audiences to get involved in artistic creation itself. |
| **Innovation in artform development** | One of the most significant innovative contributions cultural institutions can make is to the development of the artform in which they operate, through the |

| | |
|---|---|
| | encouragement of new and experimental work in their programming. |
| **Innovation in value creation** | Cultural institutions are searching for new ways to measure the economic and cultural value they create for audiences and their wider group of stakeholders, and to translate these into terms that policymakers, funding agencies, donors and private investors can relate to. |
| **Innovation in business management and governance** | Cultural organisations face challenges in strategic management that are peculiar to the artistic or cultural area in which they operate; dealing with these challenges requires a constant review of the organisation's business model and a search for innovative financing strategies in response to a changing funding environment. |

Table 3: Four categories of innovation (Bakhshi and Throsby 2010, p.13)

This definition of innovation in the cultural sector will be used as a basis for this research, with particular focus on the category "Innovation in audience reach".

### 2.4.3 DIGITAL INNOVATION AND ORGANISATIONAL CHANGE

Digital technology and information now pervades the operation and the strategic vision (see example digital strategies from Hromack and Stack

2013) of most museums and cultural heritage institutions. Parry and Marty (2008, p.307), believe that "It is very difficult to conceptualize 'museum' without also conceptualizing 'technology'" which is an interesting assertion as the museum definitions discussed in section 2.1.1 fail to discuss technology adequately. They go on to state that digital technology has "exerted an influence on museums that outstrips any previous technological innovation in the profession." (Parry and Marty 2008, p.307). Over the past 40 years, digital technology has contributed to every aspect of museums, redirecting and reprogramming not only the devices used for display, the systems that facilitate the management of collections and the tools used to research and conserve objects but also the key visitor experiences of the museum (Parry 2010, p.1). Despite this permeation of digital media the place of cultural heritage and cultural heritage institutions within this new digital world is still unclear and in flux (Peacock 2008; Tallon 2008). Digitisation, visualisation, networking, syndication and user generated and co-created content have shaken the sector's foundational constructs of authenticity, materiality, ownership, authority and audience.

Within the museum sector, a sense of the fluid, fast-moving change arising from the proliferation of digital technology is palpable. Signs and talk of change are everywhere. A relatively recent swathe of academic monographs and anthologies address the question of the shifting place of museums in the digital networked world (Cameron and

Kenderdine 2007; Parry 2007; Marty and Burton Jones 2008; Tallon and Walker 2008; Parry 2010; Giaccardi 2012). An even greater number examine the changes reshaping, 'reinventing', 'reimagining' and 'recoding' museums and museum management more generally (Moore 1999; Weil 2002; Gail Anderson 2004; Witcomb 2003; Sandell and Janes 2007; Parry 2007). Yet, while change and innovation are now ubiquitous in museum practice and dialogue, change processes are still not well understood, particularly in relation to the effects of digital technology. In fact, a recent report *Digital Culture: How Arts and Cultural Organisations in England use Technology* for the Arts Council, The Arts and Humanities Council and Nesta suggests that museums may be less engaged with digital technology and innovation than other arts and cultural organisations (MTM London 2013). Abraham et al. (1999) point out that the literature that focuses on organisational aspects of museums is relatively scant (Newlands 1983; Janes 1997; Janes 2013; Griffin 1987; Griffin 1988; Griffin 1991). There is a gap in our understanding about how change and innovation happens and how museum professionals can shape their outcomes. With this in mind this section of the research and one of the overarching aims of this thesis sets out to explore ideas about change, innovation and research and development in museums in the digital age. It will examine the current understanding what change and digital innovation is in a museum context and what implications this has for visitors and the institutions alike.

Since the introduction of the Digital R&D Fund (Nesta 2012), Research and Development (R&D) projects that utilise digital innovation are being classed as the Holy Grail; offering museum professionals quick, new and experimental ways of engaging visitors with content, and creating new relationships between museums and their users (Bakhshi and Throsby 2010; Tanner and Deegan 2011; Tanner 2012a). Innovation and R&D undoubtedly vary in their impact on a project and on the institution as a whole. Many innovations are incremental, representing improvements to how value is created for established workflows. For example; digital labels within museum exhibits represent an incremental innovation, with the potential to offer greater value (more in-depth information, multi-media presentation, multiple languages, etc.) to an established audience, the museum visitor. Such innovations can be of great significance, and may involve new cutting-edge technology, but they primarily add value to an existing, established market or audience. Some innovations have a particularly disruptive potential. Disruptive technologies, as described by Christensen (1997), change the value proposition in a given market. When introduced, they typically under-perform in a traditional market, yet have features a few fringe customers value. But as the disruptive technology matures, it may have great consequences for established institutions. Christensen's framework for disruptive innovations offers a framework for analysing how museums can deal with these disruptive changes, and how they can manage the disruptive pressures they

currently face with digital innovation and visitor generated content projects.

Christensen (1997) describes three factors that define the capabilities of an institution: First are its resources, such as people, and technology; second are its processes – formal and informal, planned or evolved; thirdly are its values and its benchmarks for success. Christensen demonstrates that while an organisation may have capable, innovative people, the processes at work may be suitably designed for traditional product development, and not disruptive innovations. Furthermore, the values of the organisation may rationally direct resources toward projects that address the needs of traditional processes. The value system of an organisation may make it impossible to justify the allocation of resources toward initiatives that do not address the needs of clearly understood audiences (Christensen 1997). The successful conversion of ideas relies on the capabilities of an organisation. An organisation, like the case study museums in this thesis, may have trusted processes to capitalise on ideas that fit within existing exhibition and interpretation, developed with established processes. But does an institution have the capabilities to break radically innovative ground for an unproven proposition? How and in what ways might digital technologies change museum organisational and management practices? How will museums deal with change? These are key questions which have yet to be discussed fully in the literature. Peacock (2008) highlights that the literature on organisational change

in museums has paid little attention to digital technology as a catalyst for change (Peacock 2008, p.344), going on to state that "although there is widespread acknowledgement of the transformative potential of contemporary digital ICTs within museums, there are no published analyses of how such a change occurred" (Peacock 2008, p.344).

One of the most extensive investigations into digital technology in the cultural heritage sector is the *DigiCULT* study published in 2002, a report detailing the "Technological Landscape for Tomorrow's Cultural Economy" (European Commission 2002). It offered a five year roadmap of how the "cultural landscape will unfold (European Commission 2002, p.31). It drew upon professional expertise within the cultural sector to present the current state of play and a vision of how cultural heritage institutions planned to engage with a succession of new technologies. Despite the *DigiCULT* study being 12 years old the findings and recommendations are still valid today. The study suggested that technologies alone should not be expected to foster structural change within museums. Rather, cultural institutions would need to reinvent themselves if they were to implement technological initiatives that were of benefit to their missions. The *DigiCULT* report identified organisational change as one of its four main thematic areas for examination. It argues the case for 'reinventing' and 'rethinking' 'institutional fabrics' at a fundamental level to meet the challenges and manage the opportunities of digital technologies (European Commission 2002, pp.82–83). The report describes information and

communication technologies as systemic technologies that would affect all practices and procedures of an institution, if properly integrated (*ibid*.). Therefore the report emphasises the limitations of utilising technology without adapting institutional practices by means of structured processes and systems. The study also points to the need for strategic implementation of technology across multiple areas of the museums. These considerations are even more relevant today when discussing how digital technology can be used for visitor generated content to capture and engage visitors. The *DigiCULT* report does much to highlight the growing importance of digital technologies in the cultural heritage sector but as Knell (2003) observes, the report discusses change at the macro level of the cultural heritage sector rather than at the individual organisational level at which change necessarily occurs (Knell 2003, p.137). Therefore the report only offers a vision of change without fully explaining the process and the impact of that change on the individual institutions (Peacock 2008, p.345).

Museums have been grappling with the accelerating pace of technology-driven changes in society since the 1990s. These institutions do understand the imperative to adapt and innovate. But as Sandell (2003) suggests; "Museums, perhaps even more so than other organizations, develop values, routines and ways of working that are often resistant to change" (Sandell 2003, p.58). Cultural heritage organisations often have a narrow view of innovation, focusing on new technology or product development and its effects on interpretive

practice and visitor experience. Innovation touches on most aspects of an organisation, including its offerings, audiences, processes and its platforms and venues. Peacock (2008) indicates that the literature there is on the use of digital technology within museums does not take an organisational perspective on technology's effects within museums (Peacock 2008, p.345).

Rather than focusing on how digital innovation can be harnessed to 'support or enhance current practice and provision' (Parry 2007, p.11), this research interest, therefore, lies in exploring the possibility and implications of cultural change and creative disruption as brought about by visitor generated content and digital innovation to the experience of engagement with museum content. This thesis aims to focus on not only the impact of digital innovation projects on visitor engagement but also to take an organisational perspective on how digital innovation is effecting instructional change within museums.

## 2.5 MUSEUMS AND DIGITAL HUMANITIES

Throughout the review of published literature undertaken within this chapter, it has become increasingly evident that there is very little in the way of museum research within the digital humanities discipline. There have been numerous discussions about the inclusive and interdisciplinary nature of the digital humanities suggesting that "Everything is Digital Humanities! Everyone is a digital humanist!"

(Terras 2011; Terras 2013, p.266). This inclusivity, however, is not clearly reflected in the main published research areas in the digital humanities field. As Pannapacker (2011) notes:

> The digital humanities have some internal tensions, such as the occasional divide between builders and theorizers, and coders and non-coders. But the field, as a whole, seems to be developing an in-group, out-group dynamic that threatens to replicate the culture of Big Theory back in the 80s and 90s, which was alienating to so many people. It's perceptible in the universe of Twitter: We read it, but we do not participate. It's the cool-kids' table.
>
> So, the digital humanities seem more exclusive, more cliquish, than they did even one year ago (Pannapacker 2011).

There is a gap in digital museum based research in the digital humanities discipline which is reflected within the international community of digital humanities professionals, evidenced by a review of conference papers, proceedings and journal papers. It would seem that the thrust of academic research within the discipline is focused on text and data analysis and there is a distinct lack of museum based research. This can be shown by a simple analysis of conference abstracts (adapted from Terras 2006 methodology[63]) published for the International Digital Humanities Conference[64], which were obtained in

[63] See Terras 2006 *Disciplined: Using Educational Studies to Analyse 'Humanities Computing'*.
[64] http://adho.org/conference

electronic format for the years 2012[65] and 2013[66], and run through a commonly used text analysis program, Voyant Tools[67], to show which are the most commonly used words in these papers (Figure 1).

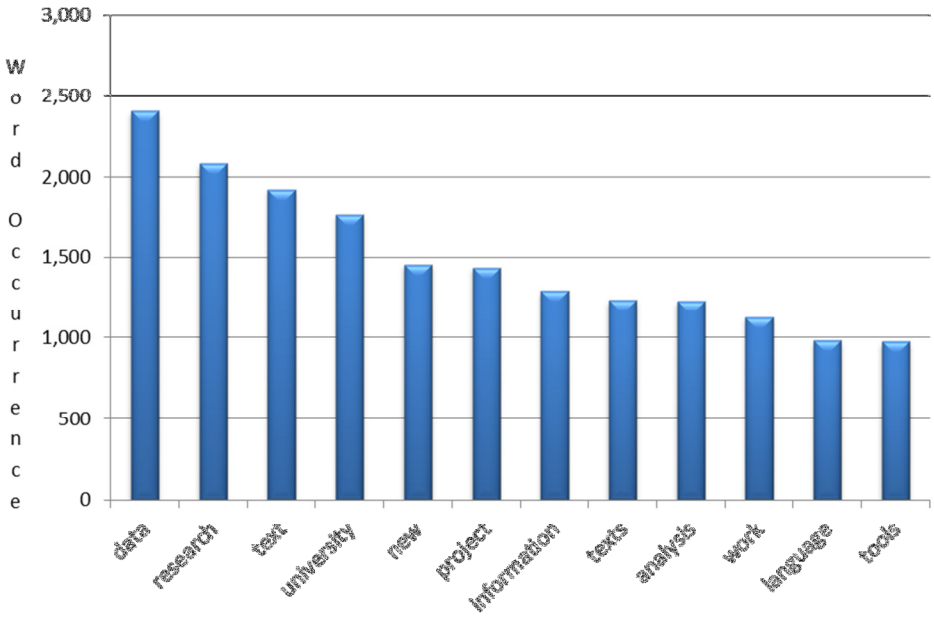



Figure 1: The most commonly used words in abstracts of the International Digital Humanities Conference 2012 and 2013

All available conference abstracts from the Digital Humanities Conference 2012 and 2013 were mined. This resulted in a corpus of 670,867 words, which, when analysed, demonstrated that 'Data' and 'Text' are indeed the main focus of digital humanities research. The term 'museum' in comparison was mentioned 138 times in the corpus, with a significant decline in representation in 2013 from 2012 (Table 4). Members of the Association for Computers in the Humanities (ACH) have noticed this discrepancy in research representation and recently during the Digital Humanities 2012 conference they voted to include in

[65] http://www.dh2012.uni-hamburg.de/
[66] http://dh2013.unl.edu/
[67] http://voyeurtools.org Voyant Tools is a web-based text analysis environment.

its organisational agenda a provision aimed at reaching out to museums and public organisations (Nowviskie 2012)[68].

| Term | Number of Word Occurrences in the 2013 Conference Abstracts | Number of Word Occurrences 2012 Conference Abstracts |
|---|---|---|
| **museum** | 40 | 98 |
| **data** | 1256 | 1148 |
| **text** | 940 | 984 |

Table 4 Number of occurrences of the term 'museum' in the 2012 and 2013 Digital Humanities Conferences

Much has been written about how digital humanities might be defined (see Terras et al. 2013 for a full volume on Defining Digital Humanities) and the questions of 'What is digital humanities?' continues to be a rich source of intellectual debate for scholars. It is not the place of this thesis to join this debate, but it was felt to be important to express the issue of digital museum research within the discipline and how it may be represented in the future. As Terras (2006, p.242) discussed, the absence of a definition may offer academics additional freedom when deciding on their research paths. Moreover, the established boundaries between, and relationships among, scholars of digital technology and the Humanities are being re-imagined through newly established centres, labs, degrees, networks and dynamic forms of engagement,

[68] Also, see the ADHO special interest group (SIG) with Libraries, set up in 2013 http://adho.org/announcements/2013/update-proposed-adho-sigs. The proposal for an ADHO SIG for Libraries and Digital Humanities can be accessed https://docs.google.com/document/d/1cfMsOwULBTGyOlUIPiQElwselIdrsrPUlTRZO8jzoTo/edit?pli=1#heading=h.9eagsa8bhyy

discussion and collaboration. The result is an exciting and challenging scholarly landscape. It is the view of the author that despite a lack of published research in the area of digital museums, it is important for academic research in the digital humanities to engage with critical, theoretical and practical appraisals of the uses of digital technologies in museums. It is the particular emphasis of this author that the integration of digital humanities research, with practice within and beyond academia is an imperative step for the development of the discipline.[69] Digital humanities does not, and should not, only happen within academia. The digital humanities community has become considerably more open, welcoming, collaborative, and accessible; embracing new approaches, methods and techniques than many traditional areas of academia, and now is an appropriate time to incorporate digital museum research into the 'Big Tent'[70] of the digital humanities discipline. However, as digital humanities becomes an increasingly larger community, there is a risk of losing sight of new and diverse research. This thesis hopes to contribute to the current trajectory of the wealth and breadth of digital humanities research and to highlight the work being undertaken in digital museum research in the discipline.

Also of interest to this thesis, of particular relevance to the second research question focusing on digital innovation, is a central debate

[69] It is not in scope here to discuss what digital humanities is, or should be, but there are several discussions of such ideas on the theory of digital humanities, for example, those collected by Gold (2012) and Berry (2012).

[70] Big Tent Digital Humanities was the theme of the Digital Humanities 2011 conference at Stanford University (https://dh2011.stanford.edu/). The phrase Big Tent is particularly apt given the often intense debates about the scope and direction of the digital humanities.

emerging within the digital humanities discipline around the concept of 'critical making'. Ratto (2011) describes critical making as the;

> Desire to theoretically and pragmatically connect two modes of engagement with the world that are often held separate–critical thinking, typically understood as conceptually and linguistically based, and physical 'making,' goal-based material work (Ratto 2011, p.253).

Whiston and Grigar (2014) go on to class critical making as the intersection of critical inquiry and hands-on making practice (Whitson and Grigar 2014). The emerging field of critical making is causing debates about the relationship between the seemingly discursive practice of critical theory, the apparent lack of theory and the tacit knowledge of digital humanists, which has been classed as a form of knowing by doing described by Ramsay (2011) as 'building or making'. Critical making is an interesting concept for us to consider in light of the fact that this thesis focuses on the making and evaluating of digital visitor generated content applications. We feel it is important to critically analyse any project which makes a 'product'. Critical making, however has been much derided (and then much defended) following a session entitled *Critical Making in Digital Humanities* at the Modern Language Association (MLA) conference 2014[71]. It is not in scope of this thesis to discuss the uproar caused by recent debates about critical

[71] http://www.mla.org/conv_listings_detail?prog_id=708&year=2014

making in digital humanities[72], but the author felt it was important to briefly mention how critical making could fit into the process of designing, testing, implementing and evaluating the digital visitor generated content applications discussed in this thesis.

### 2.5.1 DIGITAL HERITAGE AND MUSEUM INFORMATICS

Most cultural organisations have become reliant on their digital Information and communication technology infrastructure to conduct their activities and achieve their objectives. While the impact of these tools in business organisations has been widely studied, the role they play in organisations such as cultural institutions, specifically museums, is not a common research subject in the digital humanities field as the previous section has discussed. There are two emerging fields, however, which consider the role of digital technology in museums. Firstly, museum informatics; which can be described as the study of how information science and technology affect the museum domain (Marty et al. 2003, p.259), and secondly; Digital Heritage (sometimes known as digital cultural heritage) (Parry 2005; Parry 2007; Cameron and Kenderdine 2007). Both fields describe how new possibilities in information technology impact the museum domain and raise fundamental questions about the experience of visiting a museum, and the very definition of what a museum and museum collections are (Marty et al. 2003; Parry 2005).

[72] See blogs posts by Koh (2014) and Schuman (2014).

Museum informatics is an emerging, multidisciplinary research area strongly influenced information science and museums studies (Marty et al. 2003). It focuses on the sociotechnical interactions that take place at the intersection of people, information and technology in museums and how information science and technology affect the museum domain (Marty et al. 2003, p.259). The field of museum informatics started to take form in the late 1990s, when extensive literature on museums and information technology (Keene 1998; Orna and Pettitt 1998) and literature on how museums have been influences by technology (Jones-Garmil 1997) were published. During the same period the term 'digital heritage' was introduced by Parry (2005) as a new area of emerging research which focuses on the relationship between, technology, theory and the museum in a critical perspective. Parry (2010, p.454) is concerned with avoiding the so-called 'technology trap' (Sola 1997, p.225) and therefore supports the emergence of a more sociological and theorised reading of museum computing. A strong parallel can be seen to the broad and narrow perspectives on museums informatics respectively. It remains imprecise whether the two emerging field of museum informatics and digital heritage are actually one, which is defined and explained almost simultaneously by different authors. Both research areas acknowledge that information technology in museums cannot be looked at in isolation, as technical issues are "nested within complex and interlocking organizational and social contexts that affect both the nature of museum work and expectations of the museums clientele" (Marty et al. 2003, p.261). It is the belief of this author that

the emerging fields of digital heritage, museum informatics and museum research within digital humanities are broadly synonymous and will be considered as such throughout this thesis.

## 2.6 SUMMARY

This chapter provides an overview of the literature for four main fields: The use of digital technology in museums, visitor generated content, visitor studies and engagement and digital innovation. A working definition of museums has been provided as enabling people to explore collections and ideas for inspiration, learning and enjoyment. We turned to a review of some of the notable factors that provide the background to museums' efforts to develop and incorporate digital technology, some for their historical impact and some for their recent transformation of the field. This research context both informs the rationale for the existence of digital innovation, and influences the provision of the means to bring it into existence and sustain it. The role of visitor generated content and the concept of radical trust in the museum space is introduced. Radical trust is a common thread throughout this thesis and will be drawn upon repeatedly to discuss the implications of digital visitor generated content on museums. This chapter considers some of the key debates around museums visitors, with regards to engagement and impact, and a definition of engagement for use in this thesis is considered. The role of digital innovation in museums is discussed,. Paucity in our understanding of change and

innovation in a museum environment was highlighted as well as a lack of research into the impact of co-creation on visitor engagement in museums. These two concepts are central to the research questions posed in this thesis; namely that there is a requirement to understand and articulate the impact of digital visitor co-creation in the museum environment and to discuss the challenges of implementing digital innovation projects in museums and the implications this has on institutional change. The final section of this chapter reflects on the place of digital museum research within digital heritage, museum informatics and the digital humanities discipline.

The next chapter brings together the analytical perspective discussed in this chapter with further theoretical and methodological considerations, it discusses the overall approach to the research, the focus of the enquiry, and how the fieldwork was conducted.

# CHAPTER 3: METHODOLOGY AND RESEARCH DESIGN

This chapter discusses the methodology and methods employed in this research. It presents the approach to the research design and discusses the different issues relating to the empirical techniques and procedures applied for data collection and analysis. An explanation of the reasons for a more qualitative rather than quantitative approach to the research design within the broader context of digital humanities is discussed. The details behind the choices of the methodology and methods are considered in particular the use of digital visitor contributions, video recordings, and observations, as appropriate methods for data collection. The process of collecting, coding and the representation of the data are detailed and the use of grounded theory as an approach is explained. The chapter goes on to define the scope and limitations of the research design and situates the research amongst existing research traditions in digital humanities and museum studies.

This research does not aim to prove or question developed theories but to offer an initial insight into aspects of digital visitor generated content in museums that has not been studied before. A mix of palpable research gaps leads to a relatively unchartered digital visitor generated content museum landscape that can be ideally studied with an exploratory approach to research design (Williamson and Bow 2002).

Research into visitor engagement, requirements and information behaviour within museums frequently displays a tendency toward quantitative methods, often involving basic statistical analysis and structured surveys. This is suitable for obtaining an overall quantitative picture of information use by a particular group but it is unsuitable for gaining a full picture of the visitors' experience of their information environment, particularly when focusing on engagement and visitor generated content behaviours. Quantitative data can determine which sections of digital content are accessed, but not whether the content was actually read or understood or if a user was satisfied with what they found (Warwick, Terras, et al. 2008). What is currently lacking are evaluative frameworks for studying visitor engagement with visitor generated content in the museum space that can be adapted and used within a changing digital environments. The aim of this research is to develop an awareness of how digital visitor generated content impacts on visitor engagement within a museum context. Therefore it is necessary to shift from the traditional macro approach to a micro approach involving a more thorough study of visitors via textual contributions, content analysis and observation techniques. By utilising methodological resources from both quantitative and qualitative approaches, it has been possible to gain a deeper understanding of visitor engagement as well as perspectives on digital technologies which encourages visitor generated content in the museum space. The multidisciplinary nature of this thesis has meant

we have borrowed more than just relevant literature from the digital humanities, information retrieval, information science, museum studies and HCI communities; from these respective fields we have also drawn traditions and approaches to research and experimentation.

This chapter is divided into six sections. Section one details methodology involved in the research. The second section discusses the use of grounded theory as an approach. Section three discusses the methods used for data collection and analysis. Section four raises the ethical challenges for undertaking this kind of investigation. The fifth section explains the processes involved in undertaking the research. The final section summaries the chapter.

## 3.1 RESEARCH METHODOLOGY

The focus of this thesis is the study and exploration of the impact of digital visitor generated content on visitor engagement in museum spaces. The consideration of whether digital visitor generated content can be used as a measure of visitor engagement is considered central to this analysis. The heart of the fieldwork conducted for this research consists of in depth case studies of two projects in which the author was embedded: first the QRator project at UCL Museums from 2010 onwards, secondly; Social Interpretation, developed and implemented at two locations under the umbrella of the Imperial War Museums

between 2011 and 2013. These were selected to gain an understanding of how digital visitor generated content applications within the physical museum space impact on visitor engagement. Particular attention was paid to how and to what extent the visitor engagement activity is structured, the characteristics of visitor behaviour, the context it takes place, and how the digital applications mediate and impact upon user engagement. Two digital visitor generated content systems were designed, tested, implemented and evaluated in three UK museums as part of this PhD research. The projects were designed and implemented between November 2010 and December 2012 and data collection specifically for this thesis was conducted at the three institutions during the period from October 2011 to December 2012.

Each museum represents a different type of organisation that is defined by its collections, galleries, size, location, events and activities and by its "user-language" (Bradburne 2008, p.xi)[73]. Each of the three case study museums institutional context represents and challenges different "place expectations" (Babon 2006, p.156) which may have an impact on how visitors approach exhibits and digital installations, based on the type of the museum that they visit.

Case Studies are a research strategy which focuses on understanding the dynamics present within individual settings to provide an analysis

[73] Bradburne describes user language as a "collection of constraints that helps shape the variation generated by an actor into patterned behavior" (Bradburne 2008, p.xi). The way through which museums structure or constrain the visitor experience (Bradburne 2008, p.xi).

of the content and processes which illuminate the issues being studied. Hartley (2004) describes case study research as consisting of a detailed investigation, often with data collected over a period of time, or phenomena, within their context. Each case study was built on a combination methods including digital visitor generated content, video based observations and observation. This was supplemented by a combination of interviews, emails, project meetings attended by the author, and archives of published and unpublished project documentation. Interviews were planned and undertaken following the guidance and good practices laid out in Williamson and Bow (2002), Gillham (2005) and Rubin and Rubin (2005). Interviews allow for complex and complete responses and explanation, and clarification can be provided to the respondents as well as to the interviewer. In this way interviews can aid with concept clarification by allowing the researcher to directly engage with the interviewees' definitions (Williamson and Bow 2002). Five interviews were conducted face-to-face and all were recorded with the exception of two interviews for which extensive notes were made. Two other individuals provided additional information via email, having provided informed written agreement for its use in the research. Each interviewee was informed in advance of the purpose of the research and the scope of the interview, and what their contributions might be used for. All interviewees granted explicit permission for their words to be recorded and used in this thesis and to be attributed to them, in accordance with

the ethical guidelines of UCL.[74] Quotes were occasionally edited to the minimum degree necessary for clarity but without altering their meaning.

It is worth mentioning that an implication of the term case study is that the unit or units in this case, are not necessarily representative of the population as unit homogeneity across the sample and the population cannot be assured (Gerring 2007). So although the case studies are museums, it is not assumed that the results from this study will necessarily produce determinant characteristics of all museums. It may well be that they may offer specific examples of the different approaches and definitions of digital innovation and visitor generated content in gallery spaces. These case studies were used to clarify issues that were raised from the literature review regarding digital innovation, institutional change and visitor engagement.

## 3.3 GROUNDED THEORY AS AN APPROACH

In accordance with the research questions, this investigation called for a methodology which could provide flexibility in process, design and analysis as to be appropriate for understanding the complex nature of visitor engagement and measuring impact of digital technology which encourages visitor generated content. Due to the combination of data collection methods and the exploratory approach to research design, it

[74] http://ethics.grad.ucl.ac.uk/

was considered appropriate that Grounded Theory as an approach would be useful for analysing data. Grounded Theory is an interpretative and inductive research approach, offering a set of analysis techniques originally developed by Glaser and Strauss (1967)[75] which provides a means for creating theory from qualitative data. Glaser and Strauss (1967) outlined a research methodology that aimed at analytically developing theories of human behaviour from empirical data, defined as "the discovery of theory from data – systematically obtained and analysed in social research" (Glaser and Strauss 1967, p.1). Strauss (1987) goes on to offer a more detailed definition:

> The methodological thrust of the grounded theory approach …is toward the development of theory, without any particular commitment to specific kinds of data, lines of research, or theoretical interests. ... Rather it is a style of doing qualitative analysis that includes a number of distinct features ... and the use of a coding paradigm to ensure conceptual development and density (Strauss 1987, p.5).

The rigidity of the grounded theory approach offers a set of clear guidelines from which to build exploratory frameworks that specify connections among concepts. Its methodological emphasis is on the participants' own interpretations and meanings to emerge with minimal researcher intervention. Theory is grounded in the data which emerges through constant comparison, coding and analysis of interview

[75] Grounded Theory split into the Glaserian and Straussian approaches after disagreements between the original authors, Glaser and Strauss.

and observational data (Douglas 2003). The author felt that the constant comparison and iterative conceptualisation would aid this research in its aim to fully understand visitor behaviour within the complex digital museum content environment and to explore visitor engagement and impact of digital visitor generated content in museums.

Central to Grounded Theory is the idea of coding: the linking of phenomena with conceptual labels. Using coding, data is initially fragmented from its original form (for example interview transcripts) and then reconstituted in terms of underlying concepts and relations (*i.e.* theory). Grounded theory uses three kinds of coding: open coding, axial coding and selective coding (Strauss and Corbin 1998). Strauss and Corbin (1998) define open coding as "the analytic process through which concepts are identified and their properties and dimensions are discovered in data" (1998, p.101) axial coding as "the process of relating categories to their sub-categories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions" (*ibid*, p.121) and selective coding as "the process of integrating and refining the theory" (*ibid,* p.143). As discussed in 3.3.5 the coding process was achieved by coding parts of the corpus of visitor contributions that appeared to refer to the same categories of behaviour and the analysis was refined through a cyclic process of re-reading the data.

According to the basic principles of grounded theory (Glaser and Strauss 1967), once an area of research has been identified, the researcher should enter the field as soon as possible. Consequently the literature is not exhausted prior to the research; rather it is consulted as part of an iterative, inductive and interactional process of data collection, simultaneous analysis, and emergent interpretation (Goulding 2005, p.296). The data collection and analysis process should direct the researcher to appropriate literature that has relevance to the emerging, data grounded concepts. We found this process useful as it involved developing a balance between drawing on prior knowledge while keeping a open mind to new concepts as they emerged from the data.

Grounded theory works well with an exploratory approach to fieldwork and data collection, as noted by Glaser (1978, p.6):

> Grounded theory method although uniquely suited to fieldwork and qualitative data, can be easily used as a general method of analysis with any form of data collection: survey, experiment, case study. Further, it can combine and integrate them. It transcends specific data collection methods (Glaser 1978, p.6).

Given the recent broadening of digital technology projects into public spaces in museums, which incorporate visitor engagement and have significant behavioural implications, the application of grounded theory was very appropriate. This research used a mixed method methodology based around the techniques and procedures of grounded theory,

broadly in accordance with Strauss and Corbin (1998). The rigours of the constant comparison and iterative approach compelled us to look beyond the superficial, to apply every possible interpretation before developing final concepts, and to demonstrate these concepts through explication and data supported evidence.

## 3.4 DATA COLLECTION AND ANALYSIS

Each case study was built on a combination of data collection and analysis methods including digital visitor generated content, video based observations and observation.

For the purpose of this investigation content analysis[76] was adopted to analyse digital visitor contributions. A large corpus of visitor contributions collected from the three case studies were categorized qualitatively using open coded content analysis where each comment was read and categorized. The visitor contributions were read sentence-by-sentence and coded in accordance with the 'open coding' and 'axial coding' elements of Grounded Theory in order to identify recurring behaviours and how they might relate to one another. Strauss and Corbin (1998) define open coding as:

> The analytic process through which concepts are identified and their properties and dimensions are discovered in data" (1998,

[76] Content analysis is a widely used qualitative research technique. This is a classic technique that is experiencing an increasingly important role in online and digital research. Content analysis is "an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and in a systematic and replicable manner" (Bryman 2012, p.289).

> p.101) and axial coding as "the process of relating categories to their sub-categories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions (1998, p.121).

The coding process was achieved by coding parts of the corpus of visitor contributions that appeared to refer to the same behaviour with the same label and refining the analysis through a cyclic process of re-reading the data, re-naming codes (when a more precise description of the behaviour could be identified), merging codes (when two existing behaviours were deemed to actually be the same), splitting codes (when behaviours that had previously been coded under one code were deemed to be different) and by re-coding parts of the data under a different code name or unlinking data from a particular code (when data no longer appeared to fit the code name that it had been assigned to). The findings emerged by 'listening to the data' as opposed to seeking to test existing hypotheses. The process involved detailed coding of the data using bespoke terminology.

Initially contributions were divided into three broad overarching categories of 'about the current question or topic', 'about the museum', or 'noise.' These categories subsume many of the behavioural characteristics that have been identified in this research. Despite the apparently simplistic categorisation it was possible to discover patterns of use and begin to understand how visitors are relating to and interpreting the exhibitions, and making meaning from their

experience. Then in chapter 7 through the cyclic process of re-reading the data, the three basic categories were split into 12 further codes. This re-coding provided more detailed understanding of how visitors were interacting with the digital visitor generated content applications.

In addition to content analysis, various quantitative measures were used such as analysing the frequency of comments according to date and time, and suitable text analysis tools[77] were used to interrogate the visitor contribution corpus. Text analysis proved useful in this thesis as a method to identify manifestations of visitor engagement. The visitor contribution data from all three of the case studies was run through a commonly used text analysis tool Voyant[78], to highlight the commonly used words in the visitor contributions. This enabled us to identify any key terms or phrases and reflect on the likelihood of expressions of engagement manifesting in the visitor generated content.

Sentiment analysis was undertaken on the digital visitor generated contributions from each case study, in order to provide an indication of a positive or negative emotion in the visitor contributions. Sentiment analysis is concerned with the automatic extraction of sentiment related information from text. Sentiment analysis, or opinion mining, is

[77] There exists a large number of approaches to text analysis in the digital humanities discipline For instance, content analysis (for an overview see Weber, (1990) and Krippendorff (2012), concordance analysis (Busa 1980; McCarty 1996), conversational analysis (Sacks 1972), qualitative text analysis (Weitzman and Miles 1995), discourse analysis (Fairclough 1992), linguistic content analysis (Roberts 1997), and network analysis (Popping and Roberts 1997). The advantages of each approach are dependent on the types and amount of texts analysed and the questions the analyst has set to answer. There is no single technique which is the most appropriate for all kinds of text analysis.

[78] http://voyeurtools.org Voyant Tools is a web-based text analysis environment.

the drawing out of positive or negative opinions from text (Pang and Lee 2008). Typically, the classes of positive and negative are used (Pang et al. 2002; Turney 2002) increasingly the class of neutrality (Koppel and Schler 2006) and degrees of sentiment (Pang and Lee 2005) are being used. This type of analysis has been predominately used for commercial tasks, however it is now beginning to be used to detect sentiment for social media texts (Thelwall et al. 2011; Thelwall et al. 2012). Automatic sentiment analysis has been applied to study how people react on Twitter toward brands and their products (Jansen et al. 2009), as well as political elections (Tumasjan et al. 2011) and sentiment is now being used to measure popular topics such as the Oscars, sport events, natural disasters (Thelwall 2011). Tate[79] also attempted to use sentiment analysis to study the museum's social media stream (Villaespesa 2013). However, some researchers have been critical of this analysis approach, questioning its validity and arguing that there is yet no lexical algorithm that can replace human analysis (Branthwaite and Patterson 2011). It is important to bear these criticisms in mind when discussing positive and negative sentiment in visitor generated content in museum spaces.

For this research the visitor contribution corpora were analysed from the three case studies using a sentiment analysis tool, SentiStrength[80] developed by Thelwall et al, (2012), in order to automatically measure emotion in the visitor comments, which provides an indication of a

[79] www.tate.org.uk/
[80] http://sentistrength.wlv.ac.uk

positive or negative museum experience. SentiStrength, uses an opinion mining algorithm to identify the polarity of the sentiment in texts: positive, negative or neutral. As texts may contain a mix of positive and negative sentiment, SentiStrength detects positive and negative sentiment simultaneously in order to detect the strength of sentiment expressed (Thelwall et al. 2010).

In order to understand the potential impact of digital visitor generated content on visitor engagement, an examination of visitor engagement behaviours with digital visitor generated content applications within the physical museum space was required. Data collection consisted of field observation and visual recording of visitors using the digital visitor generated content applications as they visited the museum spaces. The method used in this thesis owes its approach to recently conducted video-based studies of workplaces (Heath et al. 2000)[81]. This method builds upon short term, field observation and video-recording of naturally occurring action and interaction in museums. The use of observations and video-based observation had two broad aims: the first was to gain an insight into current visitor behaviour and levels of engagement in museum spaces in order to provide a context for understanding any possible impact of visitor generated content

[81] Video recording and video analysis is increasingly used across a variety of disciplines to study activities and interaction (Knoblauch et al. 2006, p.11). Workplace studies in particular are making use of video recordings to develop and specify key elements of research into workplace activities (Heath et al. 2000). Workplace studies focus on the analysis of organisational activities in a varied range of workplace settings; such as surgical surveillance rooms and the London Underground (Heath and Luff 1992). Heath et al., (2010) suggest that video recordings of work and interaction in these workplace settings, augmented by field observations enable researchers to explore topics and human behaviour which previously remained 'largely unexplicated' (Heath et al. 2010, p.8).

technology on visitor experience. The second aim was to bring to the fore behavioural characteristics in relation to visitor generated content on museum digital devices which may be worth examination in further studies.

Field observation[82] was undertaken in order to provide us with ways to check for nonverbal expressions of engagement with the digital visitor generated content applications, to determine who interacts with whom and what, to grasp how participants communicate with each other, and check how much time is spent on various activities (Schmuck 2006). Observation of behaviour is a useful way to better understand the nature of visitor experience (Diamond et al. 2009, p.55). It is believed that observations can help the researcher to personally experience and gain access to the real-world in particular settings (Spradley 1980; Grove and Fisk 1992). In this thesis, the observation technique was unstructured, as the field visits aimed "to record in as much detail as possible… with the aim of developing a narrative account" (Bryman and Bell 2007, p.283) which could be used as an additional method to support further triangulation of data. This study was conducted between 29th September 2011 and March 2012, and involved the Grant Museum of Zoology, Imperial War Museum London and Imperial War Museum North. The observation study consisted of observing, coding and measuring visiting times and interpreting visitors' behaviours during the observation period. Visitors were observed and their

[82] Observation techniques have been used over a long period of time in museums to understand how visitors behave in exhibitions see for example Gilman 1923; Serrell 1997; Goulding 2000; Black 2005; Diamond et al. 2009.

pathways and behaviours marked on a copy of the exhibition floor plan and field notes were taken. A total of 62 visitor behaviour maps were recorded.

The observed individuals were selected following a continuous random sampling method. In accordance with this method, the data collector (the author) was stationed at the entrance of the exhibition and five seconds after being in place, selected the first eligible visitor to cross the threshold. The data collector followed the visitor through the exhibition, recording components at which the visitor stopped, time spent at individual components, and total time spent in the exhibition. When the selected individual exited the exhibition, the data collector concluded the tracking and then resumed her position at the entrance, awaiting the next eligible visitor.

In addition to field observation, video based observation was conducted to study the naturally occurring interaction between visitors and the visitor generated content technology. Over the last twenty years video recording has become an increasingly accepted method of data collection and analysis in the social sciences, especially in anthropological and ethnographic research. Visual media, including photography and film and more recently video have been highlighted as a tool providing unparalleled opportunities for research in the social sciences (Heath et al. 2010, p.2). Gottdiener, as early as 1979, described the advantages of video as an observational technique (Gottdiener

1979). The main advantages include; a cheap, reliable, relatively easy to use tool which is adaptable to most research situations (Knoblauch et al. 2006; Heath et al. 2010). It is argued that visual recordings of user activity enhances the informational content of field studies by adding additional data producing a more accurate, more detailed and more complete record than that of traditional human observation techniques (Gottdiener 1979; Grimshaw 1982; Knoblauch et al. 2006). Video recordings can give access to discussions, bodily conduct and the material environment (vom Lehn et al. 2001) providing a richness and complexity of human interaction (Gottdiener 1979; Grimshaw 1982; Lomax and Casey 1998; Heath et al. 2010) otherwise unavailable to unaided observation methods.

There is an established interest in using image based research, particularly video recordings for the study of visitor behaviour within museum environments. Shettel et al. (1968) used film to record visitor movements within an exhibition; analysing the recordings for the attracting power of different elements of the exhibition. Various studies in the 1990's utilised video to record patterns of visitor conduct and navigation patterns through galleries (Falk 1983; Morrissey 1991; McManus 1998). In recent years, there has been an increasing interest in confronting visitors with video recordings of their own conduct to elicit talk and discussion between them. It appears that Video Traces (Stevens and Hall 1997) or reflective video-techniques (Ellenbogen 2002) can be an important tool to engender talk between visitors and to

make them reflect, not only on their behaviour, but also on exhibit properties and characteristics. More recently video-based field studies have also been used to observe and analyse social interaction at the "exhibit face" (vom Lehn and Heath 2006).

Data collection was conducted at the Grant Museum of Zoology and Imperial War Museum North over a four week period (between 6th-24th August) and generated a substantial corpus of naturalistic observations[83]; data included visitors of different ages, those alone and with others, and visitors who came on different days and at different times. Detailed transcripts (see section 4.6 and 6.6 for examples) were produced for each recorded visitor engagement occurrence to facilitate the micro-analysis of the different interaction modes portrayed during each encounter with the digital visitor generated content applications in both the Grant Museum and Imperial War Museum North.[84] It has been argued that video recording transcripts present an incomplete picture of interaction. Derry et al. (2010) suggest that transcripts are never complete, as the transposition of the visual to the written is always reductive (Derry et al. 2010, p.20). In addition, the transformation of the original multi-dimensional video data into single textual data, (Flewitt 2006) adjusts the multimodal nature of interaction. These arguments raised concern about using transcripts as

[83] A total of 90 individual video observations were recorded, ranging in length from 00:02 seconds to 04:55 minutes.

[84] Video based observations were not undertaken at IWM London due to restrictions on filming in the gallery space.

a data analysis method. In order to alleviate the methodological issues still frames were used in conjunction with written transcripts to reinforce the representation of the video data, enabling the transcripts in this research to include richer contextual information (Lemke 1998).

Although research suggests that technologically rich exhibits attract and hold visitor attention (Sandifer 2003), there is little understanding of how visitors examine and make sense of digital-based exhibits. The research that exists relies on making sense of one form of social interaction, namely visitors' conversations (Leinhardt and Knutson 2004). There is a long tradition in the use of conventions for transcribing verbal behaviours (Jefferson 1984; Jordan and Henderson 1995), but there is little evidence for the inclusion of non-verbal behaviours in transcription. A few researchers have started to include the non-verbal mode in transcripts (vom Lehn 2002; Bourne and Jewitt 2003; Rahm 2004; Meisner et al. 2007), but the methodology does not appear to have progressed further.

This section of the research focused on gestures and vectors shaped by gaze, hands, and posture (see appendix 4 for previous research on gestures and behaviour which the author found helpful during the video based observation data collection and analysis), each one of these modes was linked to the time of occurrence and its duration in the transcript (see Table 11 for example). Furthermore, the transcripts were always accompanied by their relevant screenshots. The transcripts were produced as a complementary tool to the visual data,

allowing the video to be the prime source of information (vom Lehn 2002). The analysis involves the detailed transcription of short fragments of video, single instances of discrete phenomena of visitor's behaviours and gestures. By comparing and contrasting characteristic actions and activities among various fragments, it is possible to begin to identify the patterns and organisation of the conduct and engagement. The fragments discussed in sections 4.6 and 6.6 have been selected because they provide particularly clear instances that are used to reflect upon common themes (Heath and vom Lehn 2004; vom Lehn and Heath 2006; vom Lehn 2010) of levels of engagement that this thesis explores.

## 3.5 ETHICAL CONSIDERATIONS

There are a number of issues that need to be considered when conducting research in and about museum visitor engagement with digital visitor generated content. This research adopted several measures to address ethical issues and to ensure the research was conducted in an ethical manner.

Data collection in museum spaces raises important ethical considerations, particularly if utilising video data. Bryman and Bell (2007) have noted a lack of informed consent as an ethical issue not widely debated in the academic literature. Nevertheless in the context of this thesis informed consent was not required. The British

Psychological Society[85] and the American Sociological Association[86] specify that informed consent is not usually required in public settings:

> Unless informed consent has been obtained, restrict research based upon observations of public behaviour to those situations in which persons being studied would reasonably expect to be observed by strangers, with reference to local cultural values and to the privacy of persons who, even while in a public space, may believe they are unobserved. (British Psychological Society 2009, p.13).

> Sociologists conducting research obtain informed consent from research participants, students, employees, clients, or others prior to videotaping, filming, or recording them in any form, unless these activities involve simply naturalistic observations in public places and it is not anticipated that the recording will be used in a manner that could cause personal identification or harm (American Sociological Association 1999).

It was important for this research to responsibly adhere to these codes of conduct and was sensitive to the concerns of participants. Additionally, for all research projects, UCL requires researchers to acquire a Data Protection Registration Number as well as an approval from the UCL Ethics Committee (this project is covered by the UCL Data Protection Registration, reference No Z6364106/2011/08/37, section

[85] http://www.bps.org.uk/
[86] http://www.asanet.org/

19, research: social research. Application approval number Staff/1011/009). Apart from a UCL official requirement, we acknowledged that we had a responsibility to "protect the [participant's] right to privacy by guaranteeing anonymity or confidentiality" (Singleton and Straits 1999, p.524) as well as from any potential physical or emotional harm. In addition, the research was preceded by collaboration with the three case study museums to address all emerging issues on ethics.

To address ethical issues of undertaking video recording in a public area, a protocol for informing visitors about the filming and research study was devised in collaboration with curators and museum managers at all three institutions. Notices were placed at the entrances to the museum spaces to inform visitors and secure their support. The notices explained the purpose of the project and that data would be used only for research and teaching purposes. Additional notices were placed at the entrance to the specific part of the museum where filming was taking place and on the camera itself, which was quite visible, but was motionless (visitors were not 'followed') and mounted on a tripod to the side of the visitor generated content application. The open but unobtrusive positioning of the camera in the museum space aimed to not unduly impact on visitors' conduct around the exhibits.

The notices informed visitors of the project and sought their permission to record, but also clearly stated that visitors, at any stage of the proceedings, were able to request the recording to cease and materials

to be destroyed. Copies of information about the research project, contact details and information about the filming process including information stating that the recordings will be used for teaching and research purposes only, were available for visitors to take away with them if they so wished. Consent forms were also available but not mandatory. Notices emphasised that any video clips would not be made available to the general public and that the individuals featuring on the recordings would be anonymised as far as possible. Anonymity was viable, as there was no personal identification involved in the data collection. We were always available to turn the camera off if a visitor did not want to participate and if a visitor had already stepped in front of the camera then they could inform us to wipe sections of the tape that feature them (Derry et al. 2010). A number of visitors approached us to discuss the nature of the project further, but no visitors showed any reluctance to being recorded; indeed, many were interested in the research. All procedures were agreed with the museum staff before filming began and were conducted in a similar manner to those described in studies conducted by Gutwill (2002; 2003)[87], which explored the assumptions underlying a method of gaining implicit consent for video recording museum visitors.

It has been argued that when being filmed, people inevitably react to the camera—rendering the data unreliable (Gottdiener 1979). Yet,

[87]Gutwill (2002; 2003) suggests participants give their consent based on "their behaviour in a situation of choice (Gutwill 2002, p.232); for example, visitors might see a sign stating that they will be recorded if they enter a particular room in the museum. If they enter, researchers infer that they have given their consent to be recorded.

research in museum studies shows that that video recording is less obtrusive than field observation and reduces the reactivity to observational methods (Morrissey 1991; Phillips 1995). Precautions were taken to both reduce reactivity and to assess data for the influence of the recording. For this research, the camera was separated from the action by attaching it to a tripod some distance from the digital visitor generated content application. Very few visitors glanced at the camera, and there was only one instance of a visitor pulling faces, waving, or otherwise observably responded to the camera (see also Meisner et al. (2007) for similar findings).

## 3.6 RESEARCH DESIGN AND PROCESS

The research has been designed to investigate the characteristics of visitor engagement with digital visitor generated content and to explore how this impacts upon museum experience. It involves understanding the engagement behaviours and textual contributions from visitors within the museum environment. One of the key issues from the literature review on visitor research and digital technology was the importance of framing questions about interaction of digital media with people that can be investigated empirically (Press and Livingstone 2006).

Preliminary background research carried out for the development of the initial thesis proposal had already suggested that the impact of

digital technology on museum experience and visitor generated content were relatively unexplored areas. The exploratory nature of the research called for a broad look at the phenomenon being investigated (Bouma 2000, p.91). A compactly structured approach would artificially limit the scope of the investigation and it was important not to impose pre-existing expectations on the research. Therefore, a more qualitative flexible research design with suitable methodological approaches was considered to be more appropriate to investigate digital visitor generated content in the museum space.

In the face of increasing pressure to prove their impact and provide evidence of value' (see section 2.3.4 for details about how museums have had to progressively prove their worth to maintain funding), more and more museums are conducting visitor engagement evaluation. Such evaluations usually include tracking and timing studies of visitors' behaviour (summarized in Serrell 1997), often combined with a fairly tightly structured exit interviews or surveys. These methods are typically time and resource heavy, we feel that visitor engagement evaluation would benefit from a component that assessed visitor engagement through the wealth of information that visitors choose to already contribute about their museum experiences through digital input in the gallery space, rather than create more evaluation processes.

As more museums are utilising digital technology to gather visitor perspectives and are seeking more rigorous ways to pursue visitor

research, the next logical step is to consider how to analyse the wealth of information that visitors choose to contribute about their museum experiences through digital visitor generated systems in the gallery space. Recent scholarship has shown that studying visitor books can be fruitful for research (Macdonald 2005; Nys 2009 - see thesis section2.2.7). If museums' solicitation of their visitors to share their views and experiences is a genuine shift in perspective and its application toward changing museum practice, then there is a need to understand what evidence can be gathered from digital visitor generated content. In order to make this kind of study feasible, we need to develop methods that do not demand the resources of time, money, and research expertise that are characterised by traditional visitor research efforts. To that end, this study had a pure research focus, that of digital outputs. Our concern here is with visitors' digital output, both the textual contributions entered into the digital visitor generated content systems and visitor interaction behaviour with the devices in the gallery.

The methodological and analytical frameworks that previous cross-disciplinary research has employed provide important resources to investigate how visitors engage with digital interpretation devices when interacting with visitor generated content.[88] The author felt it to

[88] Other academic disciplines; information science, education, cultural studies, media and communication, social studies of technology and human computer interaction are becoming interested in the changing digital environment and are creating a range of methodological questions, considerations and new approaches (Livingstone 2004; vom Lehn and Heath 2005; Honeycutt and Herring 2009; Rotman et al. 2012). Previous work on analysis of online user generated content and social relationships (either online or offline have

be important to draw upon the methodological considerations of this previous research, namely Macdonald's 2005 work on visitor book analysis and vom Lehn's (2002) doctoral work on ethnographic observations and video based observations in order to investigate digital visitor generated content and digital engagement in museums. Both Macdonald's and vom Lehn's approaches to visitor research lend themselves quite nicely to investigating digital visitor contributions and digital interaction due to their focus on unobtrusive study of visitor output.

In order to understand the potential impact of digital visitor generated content and visitor engagement, a detailed examination of the context of museum experience within the physical museum space was required. This study, therefore, employed a combination of research methods to a produce a useful methodological synergy. We decided that the best approach was to use a combination of data collection methods and employ these different datasets to construct an understanding of digital visitor generated content and digital innovation in museum spaces. The data for this study was collected using case studies that include visitor contribution data, in the form of digital comments inputted into digital devices and participant and video based observations.

The research process is influenced by grounded theory as it was considered to be a useful approach for understanding the complex nature of visitor experience (a full discussion of grounded theory as an

established a recognised set of research approaches, namely conversation analysis (Zeller 2012 pers. comm., 20th December) and ethnography (Livingstone 2004).

approach is presented in section 3.6 later in this chapter). The grounded theory approach advocates the use of multiple data sources converging on the same phenomenon and terms these 'slices of data' (Douglas 2003). Our study employed multiple data collection methods to strengthen grounding of theory and enhance reliability and the internal validity by triangulation of evidence.

The literature review was used to identify key concepts for the study and to inform the reiterative design of the research questions. Although initial research questions and objectives were established prior to undertaking the literature review, we assumed that an important part of the research process would involve reworking and fine-tuning the research questions as the main issues and concepts were gradually revealed through the collection and analysis of data. The first stage of the data collection was in the form of archiving visitor contributions in order to provide first hand data of visitor engagement behaviour in museum spaces. This was followed by naturalistic observations and experimental evaluation: video based empirical field studies from two case studies collecting further data of physical visitor experience with digital social interpretation and visitor generated content using video recording. Finally the collected data was analysed using content, textual, and sentiment analysis of interaction and comments. Figure 2 is an overview of the research design.

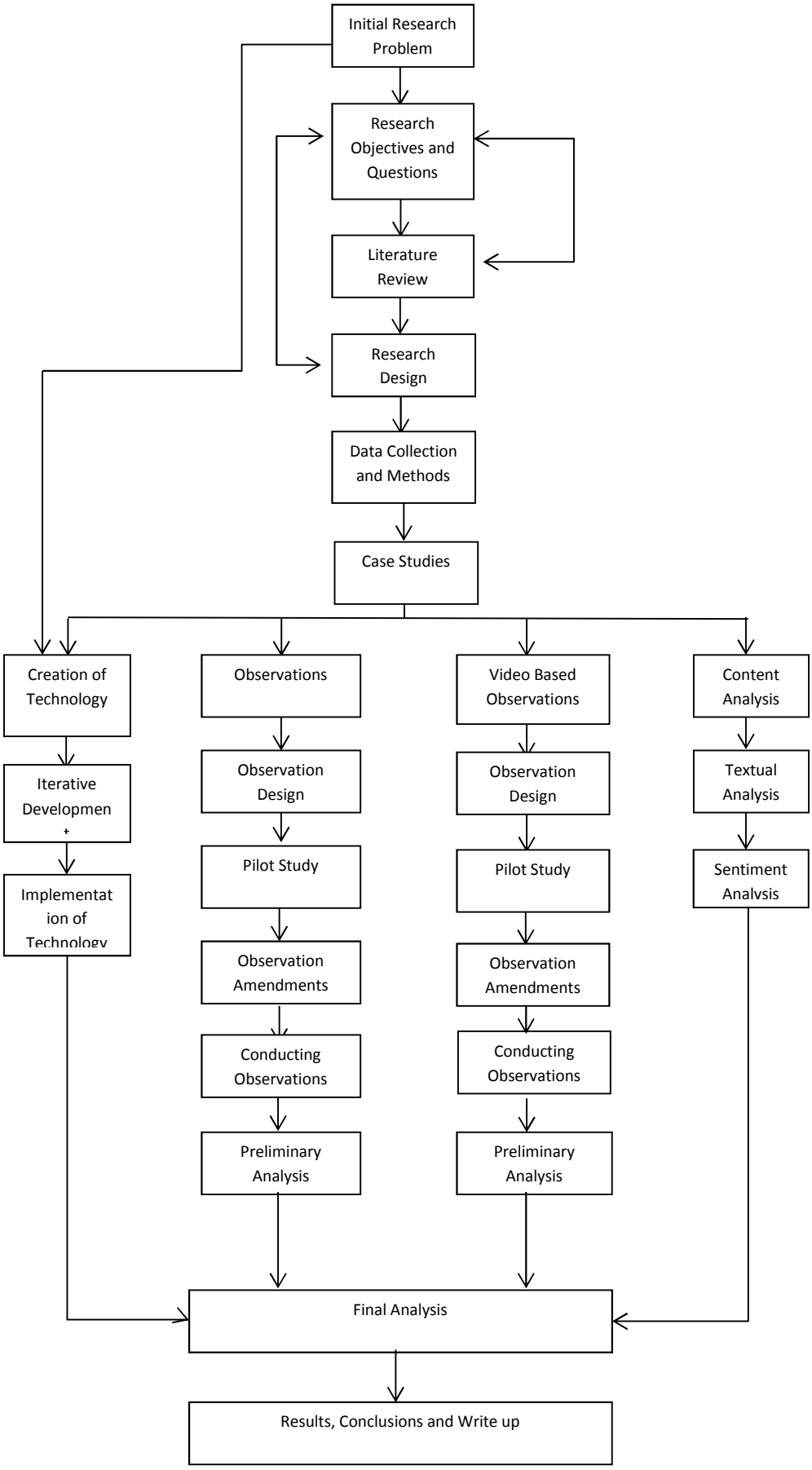



Figure 2: Overview of Research Design

The research was organised into eight distinct but interdependent stages. The findings of each stage provided the basis for the particular development of the following stage of research:

The research was carried out over a twenty four-month period as shown in Table 5.

| |
|---|
| **Literature Review: January 2011 – December 2013** |
| **Data collection: November 2011 to December 2012** |
| **Case studies informal interviews: February-March 2012 and November 2013** |
| **Visitor contribution analysis: February 2012- June 2013** |

Table 5: Research methods and timeline

The research was then broken down into twelve distinct but interdependent stages. The findings of each stage provided the basis for the particular development of the following stage of research (Table 6):

| **Project Deliverable** | **Timeline** |
|---|---|
| **Project Deliverable 1: Research Context** | 2011 |
| **Project Deliverable 2: Literature Review Museums and Technology** | 2011 |
| **Project Deliverable 3: Literature Review Visitor Studies** | 2011 |

| | |
|---|---|
| **Project Deliverable 4: Methodology and Research Design** | 2011 |
| **Project Deliverable 5 : Upgrade Paper** | December 2011-May 2012 |
| **Project Deliverable 6: Study of QRator - Analysis of Visitor Contributions** | November 2011- February 2012 |
| **Project Deliverable 7: Literature Review Digital Innovation** | May 2012- December 2012 |
| **Project Deliverable 8 : Review Research Questions** | July 2012 – January 2013 |
| **Project Deliverable 9 : Study of Social Interpretation IWM - Analysis of Visitor Contributions** | July 2012 – February 2013 |
| **Project Deliverable 10: Study of Social Interpretation IWM North - Analysis of Visitor Contributions** | May 2012 – January 2013 |
| **Project Deliverable 11: Comparative Study of Visitor Contributions** | May 2012 – December 2012 |
| **Project Deliverable 12: Video Based Exploratory Study** | November 2012- December 2012 |
| **Project Deliverable 13: Thesis Write Up** | January 2013- September 2013 |

| | |
|---|---|
| **Project Deliverable 14: Conclusions and Revisions** | September 2013- December 2013 |
| **Completion and Submission** | January - March 2014 |

Table 6: Project Deliverables and Time line

### 3.7 SUMMARY

This chapter describes the research design and the different methods and procedures employed for data collection and analysis. The literature review as part of the methodology of this study aided in the reiterative design of the research questions and helped identify the key concepts. The different issues regarding the research methodology, in particular the use of video recordings, observations, and visitor contributions as appropriate methods for data collection were discussed in conjunction with the approaches towards data analysis including, grounded theory, content, textual and sentiment analysis.

# CHAPTER 4: STUDY OF VISITOR GENERATED CONTENT IN THE GRANT MUSEUM OF ZOOLOGY

The QRator project was built for the Grant Museum of Zoology in 2010-2011 to explore how digital technology can create new models for public engagement in museum spaces. It was delivered as part of the UCL Public Engagement Innovation Seed Fund[89] and installed in March 2011. To date, early 2014, the QRator project is still in situ and has won the 2012 Museums and Heritage Award for Excellence in the Innovation Category[90], and the Grant Museum has won the 2013 Museum and Heritage Award Culture Pros Pick[91] and was nominated for the European Museum of the Year 2013[92].

The study reported in this chapter begins to address the first of the research questions focusing on how digital visitor generated content impacts on visitor engagement within a museum context. This chapter presents and discusses the QRator digital visitor generated content application and the results from the first case study of visitor generated content in museums where data was collected by archiving visitor contributions. This study documents the findings of the ongoing collaborative research project, focusing on the development and implementation of the QRator project within the Grant Museum of

[89] The Public Engagement Innovation Seed Fund ran from 2009 to 2011 and was open to all to staff and PhD students for details see http://www.ucl.ac.uk/public-engagement/casestudies/innovationseed

[90] http://www.museumsandheritage.com/show/awards/previous-award-winners/2012-award-winners

[91] http://www.museumsandheritage.com/show/awards/award-winners-2013

[92] http://www.europeanmuseumforum.info/emya/emya-2013/emya-2013-nominations.html

Zoology, UCL. It provides an overview of how the bespoke digital visitor generated content system; QRator, was designed, tested, implemented and evaluated. The chapter is divided into five sections: Section one introduces the research and focuses on the setting where the data collection took place, in order to introduce the physical structure of the museum space, and the institutional character of the case study. Section two describes the digital visitor generated content application: QRator. Section three explains the data collection and analysis methods used. Section four presents the analysis of the results of the data. The final section provides a discussion of the findings.

## 4.1 RESEARCH SETTING

This study was conducted between March and November 2011, and involved the Grant Museum of Zoology, part of UCL Museums and Collections. UCL holds a range of collections that cover a wide variety of disciplines, reflecting the breadth of the university's academic work. Three collections are open to the public; the Petrie Museum of Egyptian Archaeology, the Grant Museum of Zoology and the Art Museum. Other collections are primarily for teaching and research but can be seen and studied by appointment. UCL's Grant Museum of Zoology houses one of the country's oldest and most important natural history collections. It was set up in 1827 to house the growing teaching collection of Robert Edmond Grant, who held the first chair in zoology and comparative

anatomy at UCL (Parker 2006; MacDonald and Ashby 2011; Cain 2011). These were housed originally in the Wilkins building, but as the collection grew from acquisitions by successive professors and curators and from the disposal of natural history collections at other institutions (Ashby 2006) there was a need to relocate. The museum was dedicated to Robert Grant's memory in 1997 when it relocated to the basement of the UCL Darwin Building (Cain 2011). This dedication to Grant marked a significant change in the museum's mission. For most of its history, the collections were organised for academic study and teaching of zoology. However, owing to policy changes across UCL related to access, outreach and engagement (MacDonald et al. 2000; MacDonald 2002), the Grant Museum significantly expanded its educational programmes for schools and local audiences. In 2010, due to numerous factors, the Grant Museum underwent relocation (for background on the relocation see Carnall and McEnroe 2011) and is now situated in the Thomas Lewis Room in the Rockefeller Building (Figure 3). It is the only remaining university zoological museum in London and houses around 67,000 specimens. The Grant Museum is a space where the public, museum professionals, students and academics alike can use objects to tackle big questions in the life sciences and engage with the way museums work (MacDonald and Ashby 2011). It has a strong history as a teaching collection but also functions as a key gateway for the public to engage with academic issues in innovative ways. This relocation provided an opportunity for the Grant Museum to make a transition to a more visitor focussed ethos, and adapt its interpretation,

providing a means for the public to engage with natural science issues in innovative ways.

Figure 3: The central space in the Grant Museum of Zoology, which opened in March 2011. Image by UCL Grant Museum/Matt Clayton.

The QRator project, housed within the Grant Museum, is one such innovative project. It explores how mobile devices and interactive digital labels can create new models for public engagement, visitor meaning-making and the construction of multiple interpretations inside museum spaces. iPads[93] located next to the exhibit cases, pose provocative questions about museums, life sciences and natural history.

[93] The iPad is a line of tablet computers designed and marketed by Apple Inc. (http://www.apple.com/uk/), which runs Apple's mobile operating system, iOS. The QRator Project used ten first-generation iPads in the Grant Museum. The first generation iPad was announced on January 27, 2010 (http://www.apple.com/pr/library/2010/01/27Apple-Launches-iPad.html) and released in the UK on 28 May, 2010 (http://www.bbc.co.uk/news/10176138). The first generation iPad device features an Apple A4 processor, a 9.7inch touchscreen display and the capability of accessing mobile networks. Ten iPads were installed into the Grant Museum on 12th March 2011; at the date of the installation iPad use in museum was a rarity. To our knowledge, the QRator project was only the second museum in the world to employ iPads permanently in displays, and the first to use them for visitor participation.

Located within the emerging technical and cultural phenomenon known as 'The Internet of Things': the technical and cultural shift that is anticipated as society moves to a ubiquitous form of computing in which every device is 'on,' and connected in some way to the Internet (Speed and Kanchana Manohar 2010). The project is based around technology developed at the Bartlett Centre for Advanced Spatial Analysis[94], University College London (UCL) and is an extension of the 'Tales of Things' project[95] , which has developed a "method for cataloguing physical objects online which could make museums and galleries a more interactive experience" (Giles 2010) via means of QR codes, or Quick Response codes; a two dimensional matrix which encodes data, in this case a uniform resource locator (URL) reference to an object (Wave 2003). The Horizon Report (2011) indicated that smart objects are the future of digital museums, where the world of interconnected items in which the line between the physical object and digital information is blurred (Johnson et al. 2011). The QRator project highlights the ability of smart objects by linking a QR code to a conversation about museum objects where museum curators can give insight into an object background. This enables members of the public to type in their thoughts and interpretation of museum objects and click 'send', their interpretation becomes part of the objects history and ultimately the display itself via the interactive label system on iPads. This allows the display of comments and information directly next to

[94] http://www.bartlett.ucl.ac.uk/casa
[95] http://www.talesofthings.com

the museum objects. QRator provides the opportunity to move the discussion of objects from the museum label onto digital interfaces, allowing the creation of a sustainable, world leading model for two-way public interaction in museum spaces. The use of QR codes should have allowed objects to be scanned and information retrieved in a quick and easy manner[96]. The introduction of QR codes within QRator provided the opportunity to move the discussion of objects from the museum label onto digital interfaces, allowing the creation of a sustainable, model for two-way public interaction in museum spaces.

The focus of the project was (and remains) on large concepts and questions about natural history, science and museums raised by museum staff, with visitors contributing their thoughts to the discussion. Each iPad asks a different question ranging from "Should we clone extinct animals?" to "Is domestication ethical?". The iPads are located next to the exhibit "QRator cases" (Figure 4) and pose provocative questions about museums, life sciences and natural history. The use of QR codes and Twitter integration allowed visitors with smart phones to 'take' the conversations, the questions and their responses away from the museum, and all content was synced with the QRator website.[97]

[96] In reality, QR codes were the least successful visitor engagement element of the QRator project, as very few visitors interacted with the QR codes (Kasbohm 2012). Nevertheless the QR technology provided the technological ability to facilitate, store and share visitor contributions.
[97] www.qrator.org


Figure 4: One of the QRator iPads in front of a related display in the Grant Museum. Image from: UCL Grant Museum/Kirsten Holst

### 4.1.1 THE GENESIS OF THE QRATOR PROJECT

The QRator project originated from a chance encounter at a conference in 2010 at which the Grant Museum curator Mark Carnall, Dr Andrew Hudson Smith from the UCL Bartlett Centre for Advanced Spatial Analysis (CASA) and the thesis author were in attendance. The timing of this chance encounter was quite appropriate as CASA had just released a collaborative project called Tales of Things[98]. Tales of Things is part of a research project called TOTeM[99] that explores social memory in the emerging culture of the Internet of Things. The project is collaboration between Brunel University, Edinburgh College of Art, University College London, University of Dundee and the University of

[98] http://www.talesofthings.com/
[99] http://www.youtotem.com/

Salford (see De Jode et al. (2011) for full details of the Tales of Things project and application). The aim of the Tales of Things project was to allow people to give a digital presence to everyday objects and their stories, and allow others to view and contribute to the object biography, either via the website or via a simple tagging mechanism (QR codes) that can be read by consumer smartphones (De Jode et al. 2011, p.19). This seemed to be an obvious application for museums; not only would a QR code permit multiple narratives for objects but it would enable the introduction of textual content longer than a 30-word label, for visitors who wanted a greater depth of interpretation. Following a discussion between the three parties about how digital technology could be utilised in the Grant Museum to involve visitor contributions and the ability to display a range of interpretations in the museum space a small pilot study was undertaken to focus on the use of the Tales of Things mobile technology in the context of the Grant Museum (Carnall et al. 2013, p.60). For a comprehensive report of this initial test case see Ross et al. (2013). After the pilot, and in discussion with the Grant Museum, CASA and colleagues from UCLDH (UCL Centre for Digital Humanities)[100], it was decided in order to create a digital application focused on visitor generated content it was necessary to adapt the Tales of Things software to create a new application specifically for the Grant Museum. The project applied and was awarded funding from the Public Engagement Unit: Innovation Seed Fund[101] to support development or

[100] https://www.ucl.ac.uk/dh/

[101] UCL's Public Engagement Unit supports activities which encourage a culture of two-way conversation between university staff and students, and people outside the university.

models of public engagement that are new to the Higher Education sector or to UCL. The QRator project started development in November 2010 and was installed in the Grant Museum in March 2011.

## 4.2 DESCRIPTION OF QRATOR APPLICATION

The main component of QRator is a custom bespoke application that is built for Apple's iOS platform running on ten iPads within the UCL Grant Museum. For further technical details about the QRator application see appendix 1. Each of the ten iPad's contained one of ten questions raised by the museum (Table 7). The questions were created by museum staff and were designed so that contributing a response does not require any prior knowledge, and the text deliberately aims to prompt thoughts that visitors may not have considered before. Each of the iPads is connected to a 'QRator case' (Figure 4) an exhibition case containing specimens and a series of object labels complementing the iPad content.

| Headline | Question | Explanation |
|---|---|---|
| ***Better the devil?*** | Is finding a cure for the common cold more important than protecting Tasmanian devils | Vast sums are dedicated to curing minor human illnesses, while relatively minute amounts go to conservation. Devil Facial Tumour Disease appeared in 1996 and has since spread across most of |

For details see http://www.ucl.ac.uk/public-engagement. The Public Engagement Innovation Seed Fund ran from 2009 to 2011 and was open to all to staff and PhD students for details see http://www.ucl.ac.uk/public-engagement/casestudies/innovationseed

| | | |
|---|---|---|
| | from a contagious cancer which could see them extinct in 20 years? | Tasmania. Diseased populations can suffer up to 100% mortality after about a year. Tasmanian devils are the largest surviving marsupial carnivore. Is preventing such a loss to global biodiversity worth less than a few human sniffles? |
| ***Conserve or display?*** | How do we balance the needs of our specimens and the desires of our visitors? | Most objects on display are irreversibly damaged by exposure to light, dust and fluctuations in temperature and humidity. The longer they are on display the shorter they will last. Instead, specimens in storage will last longer without requiring conservation treatment and care; however, visitors would not be able to readily see the specimens. Without specimens there wouldn't be a museum. |
| ***Bulldogs or brown hares?*** | What makes an animal British? | Conservation decisions depend on whether species are native. Fallow deer and brown hares are both protected "British" species, but were |

| | | |
|---|---|---|
| | | introduced about 1000 years ago. Grey squirrels are well known "foreigners", introduced in the 1800s. How long does a species have to be in Britain to be "native"? Does is matter if a species was transported here by humans or naturally colonised? |
| ***Humans vs animals*** | Should human and animal remains be treated any differently in museums like this? | The Human Tissue Act controls how human remains are displayed, used and stored. Museums are working to return historic remains to the nations from which they were taken in the past without consent, and no human material less than 100 years old can be displayed without permission from the individual. No such systems protect non-human animals. Why are humans treated differently? Would a primate display be incomplete without a human? |
| ***Real or fake?*** | Is it ever acceptable for museums to use | Many museums use casts, reproductions and models in place of original objects. When is this |

| | | |
|---|---|---|
| | replicas? If so when? | appropriate? Should objects which aren't "real" be highlighted? What's the point of a museum having a genuine object in store if they replace it with a replica for display or handling? Does spotting a replica make the whole museum less believable? |
| ***Pets or wildilfe?*** | Can keeping pets be justified given their impact on wildlife? | People who say that they are animal lovers are often referring to their pets – it's why people react more strongly to a domestic cat preserved in the Museum than to an endangered tiger. Globally, feral pets and pets wandering from home have hunted many species to or near extinction. Do pets have any positive effects on wildlife? Can these effects ever outweigh the damage? What is the difference between wild and natural? |
| ***Too testing?*** | Every medicinal drug you have ever taken was | In the process of developing new medical drugs, UK legal regulations require them to be tested on |

| | | |
|---|---|---|
| | tested on animals. Is this a necessary evil? | mammals before they are tested on human subjects. The argument is that an untested drug's affect on living organs can only be tested on a living animal, and the risk is too high at this stage to chance on a person. Is this justifiable? |
| ***Taboo topics?*** | Should science shy away from studying biological differences between races? | Studying the differences between people from different parts of the world was common in the past. Now, in more enlightened times, such science has become somewhat taboo, possibly due to the fear that conclusions would be drawn that could be considered racist. Should some topics be off-limits to science, when the potential outcomes are unknown? Is it racist to say that different races are biologically different? |
| ***Defining animals.*** | What do we mean by platypus? | Species are defined based on the description of one or a few individuals. Any other individual is called the same species if it is similar |

| | | |
|---|---|---|
| | | enough to those "type specimens". This is a human definition with no real relevance in nature. How similar can the things we call platypuses, or any animal, be to the original? Are the stuffed, pickled and skeletal platypuses in the Museum still real platypuses, or just representations – like a photo or drawing? |
| ***Captive and conserved?*** | Do animals in zoos have any value for conservation? | A major justification for keeping animals in zoos is that they serve to educate the public about environmental issues. 95% of animals in zoos aren't endangered and very few that are are part of European Captive Breeding Programmes. Can the remaining species act as ambassadors for the rare ones? Do zoos teach valuable lessons, and increase appreciation and respect for the natural world? |

Table 7: QRator question content on Grant Museum QRator iPads between March and November 2011

Each provocative QRator question is framed in a virtual, interactive museum label (Figure 5) that displays the question presented by the Grant Museum Staff along with a short background explanation of the issue. The design of the application mirrors the current wooden museum labels[102] that are displayed throughout the Grant Museum (Figure 6).

[102] In 2005 the Grant Museum took part in a London Museums Hub project Say it Again, Say it Differently, aiming to completely reinterpret the Museum. Despite opening its doors to the public In 1995 little work had been done to make the collection into a useable space for non-academics. As a small, university-based museum, the Grant Museum faces challenges in communicating specialist information to both a narrow interest group and a wider public audience. The 'Say it Again, Say it Differently' project was funded by the London Museums Hub and aimed to address these issues of communication and interpretation within the museum. By creating completely new ways of displaying and communicating information about the museum's collections, the project has helped to broaden the museum's appeal to a non-specialist audience. The result included new graphics and labels. The museum developed all new content with help from the design skills of ACME Studios, which developed into the entire re-interpretation of the museum.

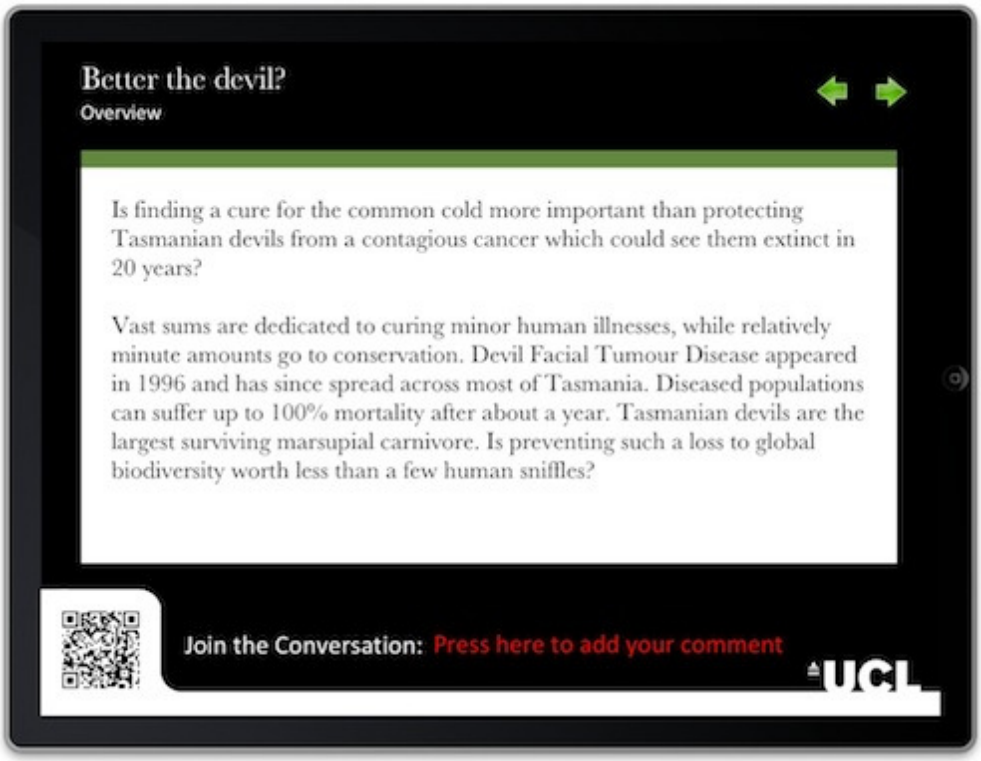



Figure 5: Interactive Museum Label displayed within QRator application showing top-level headline, main question and background information. The top right displays the top level question or statement; "Better the Devil?". In the centre of the screen is the second level of interpretation, the main question followed by supporting information.

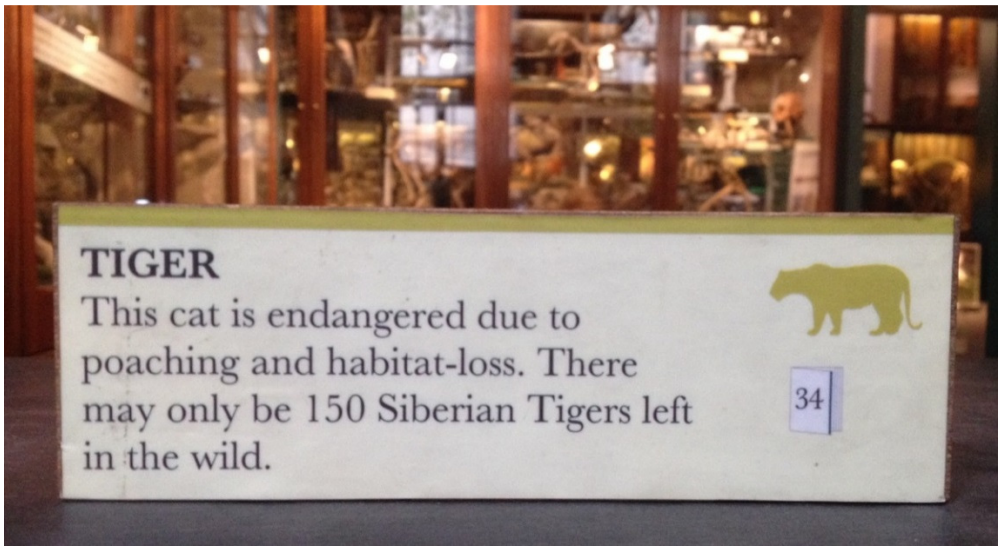



Figure 6: Wooden museum label from the Grant Museum

The QRator iPad, combined with the connected QRator exhibition case provides a range of levels of interpretation designed to make the topic clear and to communicate to visitors that their opinion is both valid and desired by the museum. The top level interpretation is displayed in the top right of the iPad screen, a short question or statement headline aimed to catch visitors interest, for example "Better the Devil?" (Figure 5). The second level of interpretation takes the form of a museum label within the iPad screen; the main question is introduced followed by background information that provides the context on the topic or question theme. Carnall et al. (2013, p.63) states that the iPad content was "typically twice the length as a standard Grant Museum label" (see Figure 6 for an example of text length on standard label) which was "was challenging to write as it needed to very succinctly provide an unbiased grounding in the question(s) at hand" (*ibid*.). The next level of interpretation is a series of object labels in the physical QRator case displays, further illustrating the questions and complementing the iPad content.

At various stages throughout the application, users are invited to interact with the device and contribute to the continuing conversation. Visitors can then respond to current questions posed by the museum, contribute to discussions, and leave comments about individual exhibits. Visitors comments are synchronised with the QRator website[103] to allow them to contribute to the continuing discussion away from a museum setting. One of the main digital interactive

[103] http://www.qrator.org

elements of the application is a QR code (Figure 7), which is prominently displayed in all views, which visitors can scan with a smart phone using the 'Tales of Things' application, available on both iOS and Android platforms, to record their response to the QRator question posed on their own mobile device. Each iPad is also configured with a particular Twitter hashtag (e.g. #GrantQR)[104], which allows the application to display a list of tweets that visitors inside museum can view and respond to from their own Twitter account via a smartphone. This social interaction allows users to carry on the discussion of the question at a later date.


Figure 7: QR code used to allow users of smartphone app to contribute to discussion

[104] Twitter was created by a San Francisco based privately funded startup and launched publicly in August 2006. http//:Twitter.com/about

It is important to note that the QRator project team purposefully chose not to include a registration screen to capture visitor demographic data as it was felt that it would act as a barrier to access which would deter visitors from interacting with the QRator questions. Therefore this research does not have access to demographic data about the visitors contributing digital visitor generated content.

## 4.3 DATA COLLECTION AND ANALYSIS METHODS

Data from the ten QRator iPads was collected by archiving contributions from March to November 2011. Each individual visitor contribution was simultaneously uploaded to the 'ToTeM' master database on the Tales of Things website, followed by the QRator website pulling the data about each current question from the master database and integrates these comments within QRator online. These comments were then aggregated together based on the current questions originally asked by the museum. A custom module was built for WordPress to collect the data from the public API and display the output as a CSV (comma separated values) file (Gray et al. 2012) which was then imported into both Excel[105] and Nvivo[106] statistical analysis packages for further analysis. This resulted in a corpus of 2784 visitor

[105] Microsoft Excel is a spreadsheet application developed by Microsoft for Microsoft Windows and Mac OS.
[106] NVivo is a qualitative data analysis computer software package produced by QSR International. NVivo can be used to assist in the analysis of qualitative data such as interviews, focus groups and questionnaires.
http://www.qsrinternational.com/products_nvivo.aspx

contributions, totalling 29,842 words and 4,496 unique tokens, providing a rich dataset for the analysis of visitor engagement.

Visitor contributions were categorized qualitatively using open coded content analysis where each comment was read and categorized. The visitor contributions were read sentence-by-sentence and coded in accordance with the 'open coding' and 'axial coding' elements of Grounded Theory in order to identify recurring behaviours and how they might relate to one another. For literature underpinning this method, see section 3.3.

Initially contributions were divided into three broad overarching categories of 'about the current question or topic', 'about the museum', or 'noise.' These categories subsume many of the behavioural characteristics that have been identified in the study. Despite the apparently simplistic categorisation it has been possible to discover patterns of use and to begin to understand how visitors are relating to, engaging with and interpreting the exhibitions, and making meaning from their experience. Additionally, as the QRator data was the first case study to be analysed, through the cyclic process of re-reading the data, one of the basic categories; 'about the museum', was split into further sub codes: opinion; question; related to a specific object; related to a group of objects; overall experience; request; and conversation. This experimental re-coding provided more detailed understanding of how visitors were interacting with the QRator digital technology.

Chapter 7 further discusses the re-coding utilised for all three case studies.

For the purpose of this study, various quantitative measures were used such as analysing the frequency of comments according to date and time, comparing comment rate between the ten iPads and suitable text analysis tools were used to interrogate the visitor contribution corpus. In addition, Sentiment analysis was undertaken on the corpus, in order to provide an indication of a positive or negative emotion in the visitor contributions. For literature on this method see section 34.

Additionally field observation and visual recording of visitors using the digital visitor generated content applications as they visited the museum spaces was undertaken. For literature on this method see section 3.4. The observation study consisted of observing, coding and measuring visiting time and interpreting visitor behaviours during the observation period. Visitors were observed and their pathways and behaviours marked on a copy of the exhibition floor plan and field notes were taken. The visitor observation sessions were undertaken at the Grant Museum during the 29th-30th September 2011; from this process 21 visitor behaviour maps were produced. Video-based recording of visitors interacting with the QRator application was also conducted. Data collection was undertaken between the 20th-24th August 2012. A total of 60 individual observations were recorded, ranging in length from 00:03 seconds to 02:27 minutes.

The large corpus of audio and video data collected at the Grant Museum were analysed in August 2012 were initially segmented and indexed using time and date markers, along with the name of the museum. The segmenting of data was initially "event-based" (Leinhardt and Knutson 2004: 80); that is, based upon the use of actions. A segment in the research was considered to start when a visitor starts heading towards the specific visitor generated content application, while it ends when interest and visitors shift away from the application. Repeated viewing of the video data led to the identification of different varieties of visitor conduct which could be categorised into levels of engagement. Therefore the segmenting of video data was then organised using a four point scale; minimal engagement, cursory engagement, moderate engagement and extensive engagement. The fragments used in this chapter refer to moderate and extensive engagement. For transcripts focusing on minimal and cursory engagement see section 6.6.1 and 6.6.2.

## 4.4 ANALYSIS OF DIGITAL VISITOR GENERATED CONTENT

The largest proportion of the comments in the corpus fell into two main categories (Figure 8); 'about the museum' (42%) and the category of 'on topic' (41%); triggered predominately by the QRator interface and questions posed by the museum curators, suggesting that visitors are inspired to share their own experiences, thus co-constructing a public

multiple interpretation of museum objects. The amount of 'on topic' contributions means that 41% of the visitors who left contributors have read at least one of the associated levels of QRator interpretation and felt compelled enough to leave a response. This is mark of the success of the QRator project since this was exactly what the museum professionals had hoped might happen;

> QRator's main aim, from the museum perspective, was to allow our visitors to get involved in conversations about the way that museums like ours operate and the role of science in society today. We are really interested in what our visitors think about some of the challenges that managing a natural history collection brings up, and other issues in the life sciences. We hoped visitors would engage with, and answer the questions posed by QRator. We hoped that a lot of the questions that were being asked by QRator would be new to them, and that they would be provoked to think about topics they hadn't necessarily considered before (Ashby 2013 pers. comm. 25th November).

Mark Carnall, the Grant Museum Curator, goes on to say;

> The biggest positive outcome is that visitors are genuinely engaging with the questions that we have asked. Despite the significant opportunities for misuse offered by a post-moderated free-text anonymous digital text box, a huge number of the responses do offer opinionated answers to the questions (Carnal et al. 2013, 64).

Interestingly, many of the visitor comments focused on opinions of the museum as a whole (42%). Visitors are using the iPads, without instruction, to make comments about the museum in general, pointing out what they enjoyed about their visit or making other experience related comments. This type of visitor response raises the question of whether a digital technology used for visitor generated content promotes an opportunity for visitors to make meaning from their whole experience, rather than engage with the exhibit specific content and interpret the exhibitions themselves. These types of 'digital visitor book' comments are now being used by the museum to "inform things we should be thinking about or doing in the future. We are looking at the responses and seeing if we need to tackle specific areas in future events or temporary exhibitions" (Carnal 2011 pers. comm. 26th September). For example the QRator visitor comments have been one source of evidence indicating that visitors to the Grant would like more object labels in the museum space. "We are now in the process of putting a 500- 1000 new labels (depending on how many we can fit in the cases) out in the museum. That is direct visitor feedback from QRator contributions that we can put into practice in the museum." (Ashby2013 pers. comm. 25th November 2013). This example provides clear evidence that as a result of visitors engaging with the QRator questions, the Grant Museum has changed their museum practice. This is a good indicator of impact.

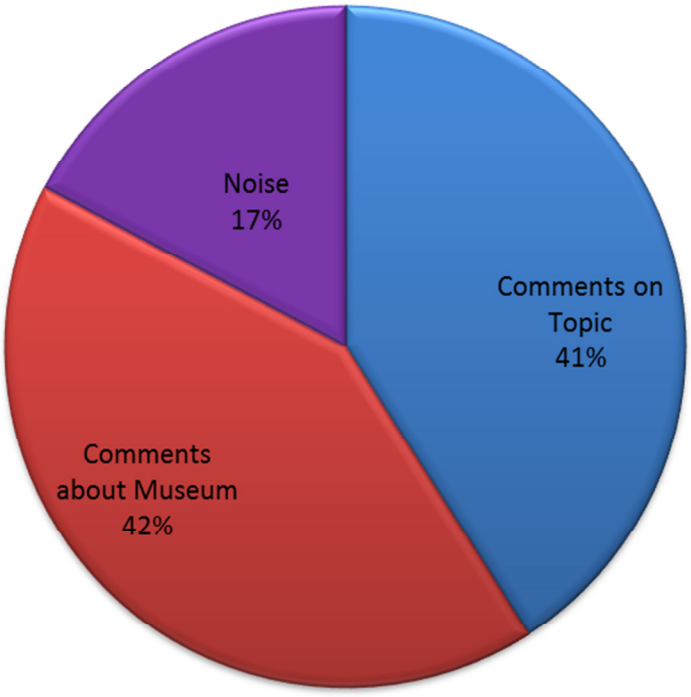



Figure 8: Percentage of visitor contribution by category. The majority of the comments in the corpus fell into comments 'about the museum' and comments 'on topic'.

The lack of spam and inappropriate commenting is surprising (17%). Many museums have been hesitant to open up communication to greater participation by visitors. The concepts of trusting audiences and providing equal participation between museums and visitors are contrary to the traditional ideas of authority, participation and communication in museums (Lynch and Alberti 2010). There is an ingrained fear in the museum profession that visitors will leave inappropriate comments when there is no moderation or intervention by the museum (Russo and Watkins 2008) despite research showing that museum visitors want to engage with complex, controversial topics by making comments or talking to staff and other visitors (Kelly 2006).

The QRator project and the Grant Museum have, however, adopted the concept of 'radical trust' in the visitor community:

> Radical trust is about trusting the community. We know that abuse can happen, but we trust (radically) that the community and participation will work. In the real world, we know that vandalism happens but we still put art and sculpture up in our parks. As an online community we come up with safeguards or mechanisms that help keep open contribution and participation working (Fichter 2006)

This radical trust is based on the concept that shared authority is more effective at creating and guiding culture than institutional control (Lynch and Alberti 2010). Inherent in the term is the suggestion of a previous lack of trust shown by museums towards visitors, but also the admission that such trust is regarded as new and perhaps dangerous. Radical trust as a concept, however is not new, it is widely practiced online in user-generated content, especially by libraries (Lynch and Alberti 2010), and has been previously applied successfully to museum blogging (Spadaccini and Chan 2007). In practising radical trust, the Grant Museum does not control the final interpretation produced. The content is genuinely co-created, representing shared authority of a new interpretative narrative that continuously develops with each new audience contribution. The 'radical' is ultimately a belief in the prevalence of a calm community of participants as opposed to malevolent vandals who will misuse the opportunity. The QRator data

suggests that 'radical trust' in visitors does indeed work: spamming and inappropriate commenting does not appear to have happened to a significant extent in the Grant Museum. The Grant Museum staff embraced the experimental and innovative nature of the QRator project and decided that they would experiment with post moderation. Carnall et al. (2012) states;

> Bravely, in order to allow visitors' comments to appear instantly (avoiding a feeling that their comment had disappeared or was being vetted), and also avoiding constant monitoring by time-poor staff unable to react in real time, excluding the use of an expletives filter, all comments would be moderated by Museum staff only after they went live on the iPads. This very much displays the experimental nature of the whole project.
>
> Not only were we unsure about the quantity of comments that would need moderating, Museum staff hadn't reached a consensus on what kind of thoughts from visitors were acceptable. As a baseline procedure for the first round of questions it was decided that profanity and nonsense (e.g. "asdfghjkl") would be moderated out but the QRator team was not explicit about what would and wouldn't be moderated otherwise instead the first round of questions were used as a test case to inform how moderation worked in the future (Carnall et al. 2012, p.7).

When comparing the individual QRator questions, it can be seen that certain questions gained more visitor contributions than others (Figure 9). Better the Devil received almost double that of Captive or Conserve. Both asked provocative questions encouraging visitors to think and contribute, yet one received a significantly higher proportion of visitor contributions.

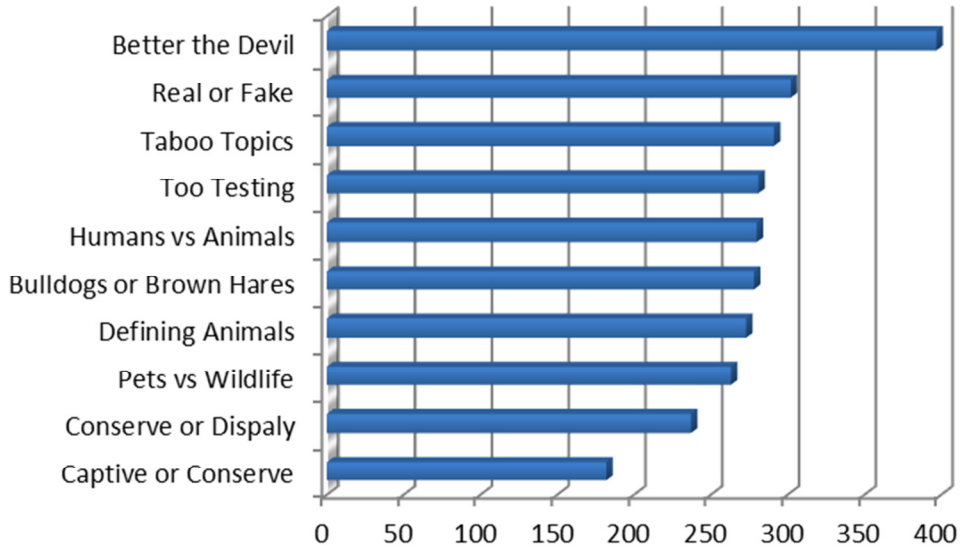



Figure 9: Total number of visitor contributions for each QRator question

When further focusing on the individual QRator questions it is possible to see that some QRator question prompts produce higher levels of on topic comments then others (Figure 10). The Real or Fake QRator question received the most contributions by visitors which focused on the topic raised by the museum (170 comments); followed by Pet vs. Wildlife (154 comments) and Humans vs. Animals (146 comments). This is likely to be because the QRator questions posed were more direct, easier to directly associate with visitors' previous experience

and own perspectives, provoking a higher frequency of posts. In comparison with Bulldogs and Brown Hares which asks 'What makes an animal British' received a lower number of on topic posts (87 comments) but a high number of comments 'about the museum' (136 comments). The lower number of on topic responses may be due to the question prompting visitors to consider reasonably difficult questions about how long it takes for a species become 'native' and if it matters if a species was transported here by humans or naturally colonised? These are quite challenging questions to answer without prior knowledge of the issue and may have discouraged some visitors from responding. However, the Grant Museum felt it was important to ask visitors to contribute to conversations on these issues in order to open up to a wider public debates that are often restricted to specialist disciplines (Carnall et al. 2013, p.66).

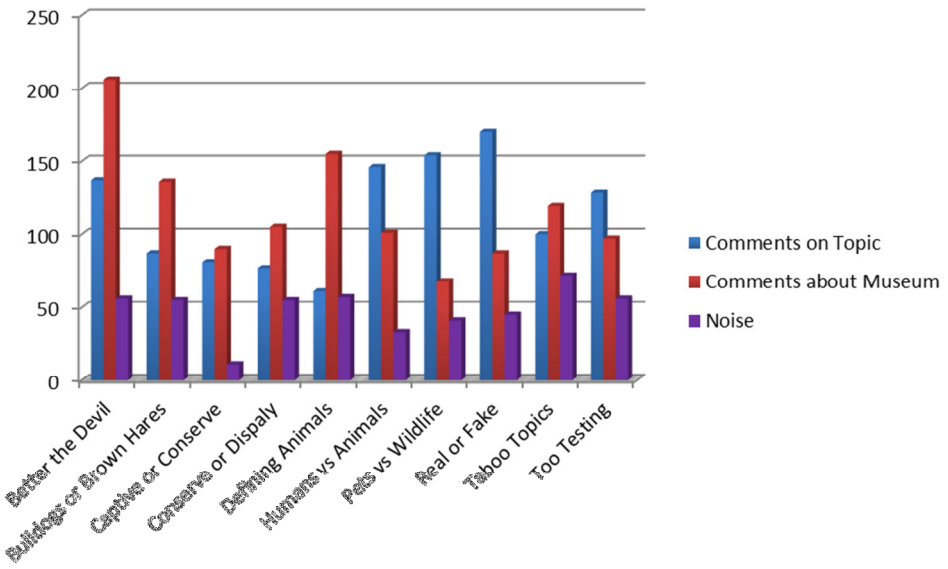



Figure 10: Category breakdowns from each of the ten QRator iPads.

In order to gain further insight into the impact of QRator on the visitor experience, it was felt necessary to re-code the visitor contributions by capitalising on Grounded Theory's cyclic nature, we were able to progress the analysis of the QRator data. Through the cyclical process of re-reading the data, it was possible to refine the analysis and split one of the basic categories; 'about the museum', into further sub categories. This re-coding provided more detailed understanding of how visitors were interacting with the QRator digital technology. The contributions of the 'about the museum' category underwent code splitting; a number of sub categories were produced: opinion; question; related to a specific object; related to a group of objects; overall experience; request; and conversation. The majority of responses (50%) fell into the category of opinion (Figure 11). The visitor contributions in this category, predominately entailed one word statements like 'awesome', 'cool' and 'amazing' (Table 8). Though there are a range of negative comments including 'gross' and 'boring'. Although it might be easy to dismiss this style of comment as irreverent and facile, it nevertheless is a significant form of visitor contribution. It is questionable whether one word answers can provide an insight into the impact of digital technology on visitor experience. Nevertheless, many of the one word answers contain strong sentiment adjectives (Table 8) making it possible to obtain information of what visitors what visitors liked or disliked and the high percentage of opinion category visitor contributions does suggest that the opportunity provided by QRator for visitors to give their opinion, has had a positive impact.

| Frequencies | Count | Frequencies | Count |
|---|---|---|---|
| **cool** | 77 | **good** | 23 |
| **museum** | 64 | **great** | 21 |
| **place** | 64 | **interesting** | 20 |
| **love** | 60 | **things** | 14 |
| **like** | 44 | **stuff** | 13 |
| **amazing** | 40 | **best** | 12 |
| **animals** | 40 | **awsome** | 11 |
| **wow** | 28 | **brilliant** | 11 |
| **really** | 26 | **weird** | 10 |
| **awesome** | 24 | **Fun** | 8 |

Table 8: Table highlighting the most popular words in the category Opinion. Words and phrases are spelt and capitalised exactly as they appeared in the QRator system.

Specific Object responses (18%) were interesting, as visitors chose to highlight key specimens within the museum. This category refers to specimens that visitors have seen and want to reference. For example, the Jar of Moles specimen was cited the most in visitor responses with a count of 31 mentions. Visitors point each other to objects and specimens without the interference of museum staff.

> One major thing that we didn't anticipate is that people are also using them as a kind of digital visitors book. As well as getting involved in the conversations, people are letting us know their thoughts on the Museum in general and what they like or dislike

> about many of our specimens. The jar of moles gets a lot of mentions. This has become a great way for visitors to point things out to each other without us telling them what we think they should see (Ashby 2013 pers. comm. 25th November).

Visitors are using the QRator application in a very democratic way to state what they have learnt, or remark about a specimen which they think should be highlighted. Visitors highlighting key specimens through the QRator application has "become a great way for visitors to point things out to each other without us telling them what we think they should see." (Ashby 2012 pers. comm. 2nd March). This suggests that QRator has opened up new opportunities at the Grant Museum for visitor centric wayfinding, enabling visitors to suggest new ways to navigate other visitors to the species and exhibits they wish to highlight.

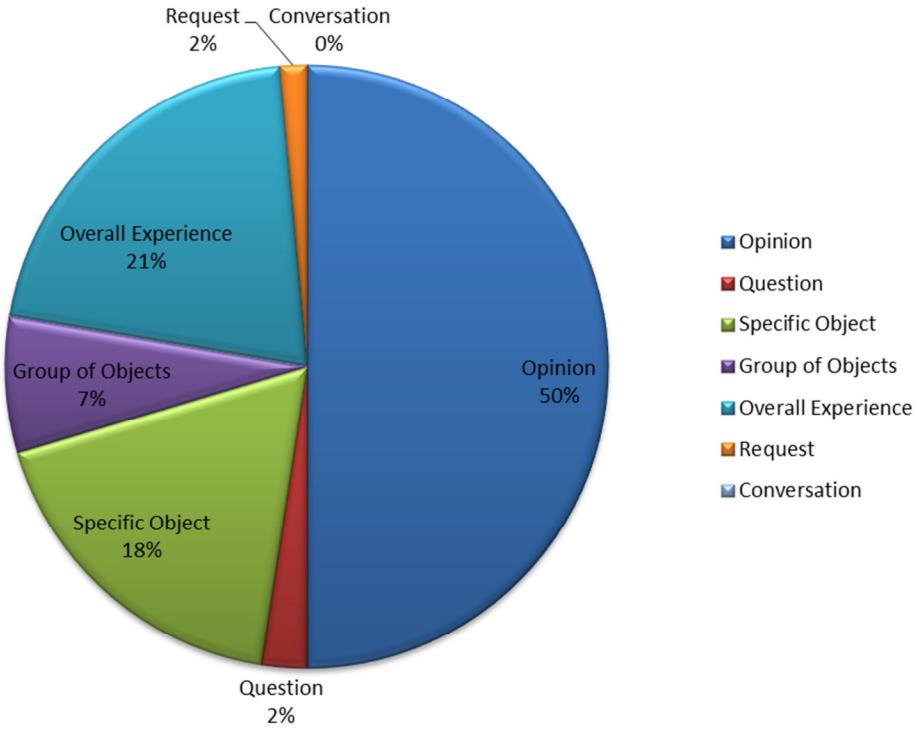



Figure 11: Visitor contributions for 'about the museum'; re-coded into further subcategories

Analysing the frequency of comments according to date and time (Table 9), comparing comment rate between the visitor contributions and total number of visitors to the Grant Museum also produces some interesting results.

| Current Question | Mon. | Tues. | Wed. | Thurs. | Fri. | Sat. |
|---|---|---|---|---|---|---|
| Better the Devil | 80 | 93 | 69 | 60 | 67 | 28 |
| Bulldogs or Brown hares | 43 | 50 | 49 | 50 | 58 | 29 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Captive or Conserve | 28 | 35 | 43 | 33 | 34 | 10 |
| Conserve or Display | 38 | 39 | 55 | 34 | 40 | 32 |
| Defining Animals | 43 | 51 | 53 | 59 | 45 | 23 |
| Humans vs Animals | 43 | 52 | 51 | 48 | 53 | 34 |
| Pets vs Wildlife | 32 | 53 | 62 | 28 | 51 | 38 |
| Real or Fake | 52 | 50 | 56 | 48 | 64 | 31 |
| Taboo Topics | 51 | 58 | 48 | 47 | 71 | 17 |
| Too Testing | 40 | 65 | 51 | 52 | 51 | 23 |
| Total number | 450 | 546 | 537 | 459 | 534 | 265 |

Table 9: Daily frequency of QRator Visitor Contributions

Firstly it is possible to see that Tuesdays, Wednesdays and Fridays are more popular for visitors engaging with the QRator iPads, Saturday is significantly lower. However this is likely to be due to limited Saturday opening at the Grant Museum[107].

[107] The Grant Museum is open to the public Monday - Saturday 1-5pm. The museum is also open for group and research visits on weekday mornings 10am - 1pm. Saturday opening. started on the 6th October 2012. At the time of data collection (March –November 2011), the Grant Museum was only open to the public Monday-Friday, only opening on Saturdays for special events.

In terms of actual visitor contribution practice, Figure 12, displays the total visitor contribution levels, which can be compared to the on topic contribution category (Figure 13). From this it can be seen that there are a series of spikes in visitor contribution activity. The 19th March 2011 received the highest number of contributions with 144 incidences. This coincides with the opening week of the Grant Museum and a Saturday celebratory event, so it is not particularly surprising that there was a high number of contributions. This high peak is followed by the 12th April, 26th October and 23rd May with 103, 88 and 80 visitor contributions. The regular troughs of 0 contributions coincide with weekends and closure days when the Grant Museum is closed to the public. However, there is an unexplained occurrence of 0 contributions between 15th June and 24th June 2011, the museum was not closed during this period nor were there any noted disturbances with the QRator system. When looking at the incidence of on topic visitor contributions there is a high peak on the 19th March 2011 with 72 contributions. This high peak indicates that half of the visitor responses left on that date were "on topic" and focused on the QRator question asked by the museum. There are also relatively high spikes on 15th April (35 contributions) and the 17th March and 12th April with 30 "on topic" contributions each.

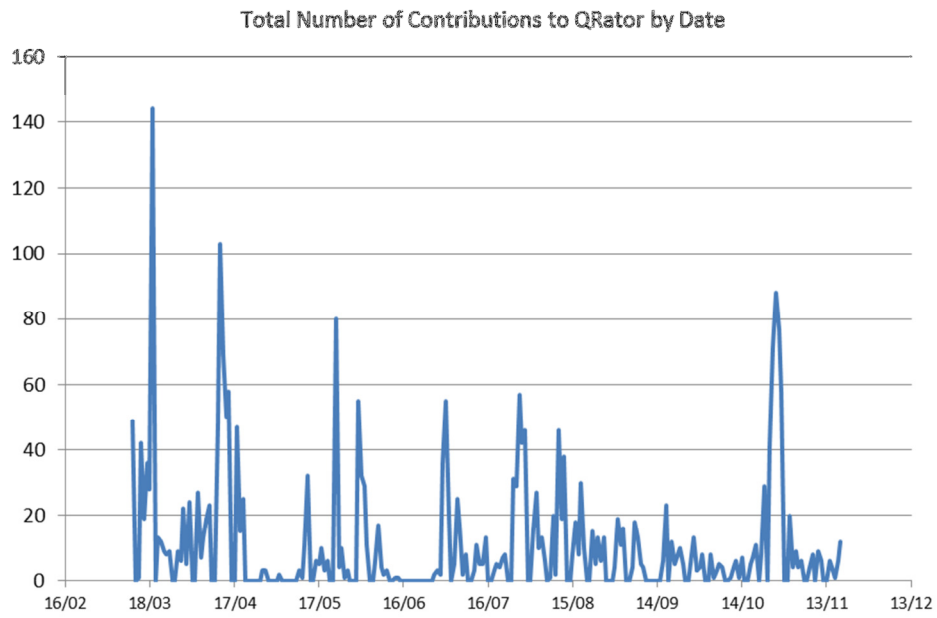



Figure 12: Total number of visitor contributions to QRator by date

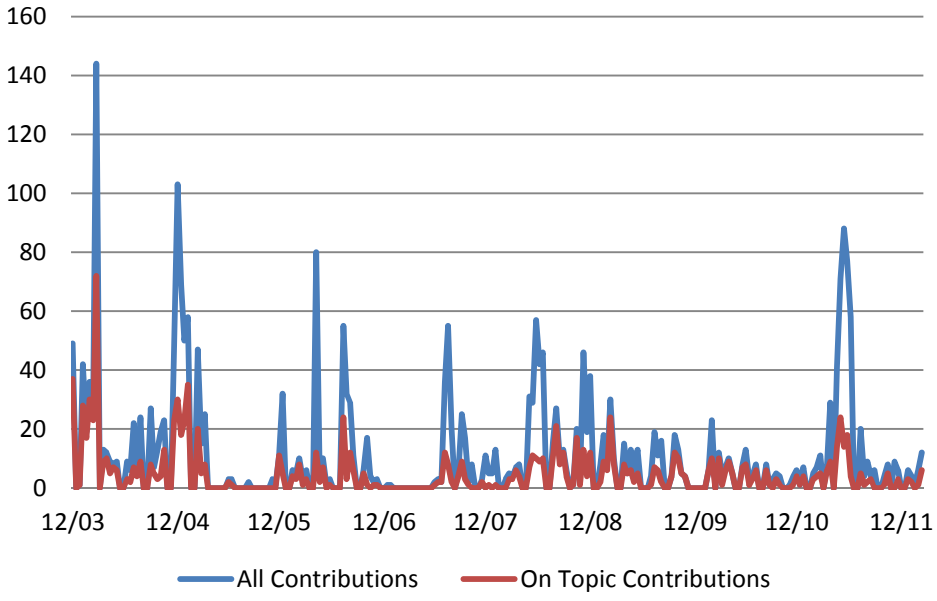



Figure 13: Comparative analysis of 'on topic' contributions against the total number of contributions

If a focus is made upon the 'on topic' contributions by each iPad QRator question a range of spikes can be seen (Figure 14). All the QRator

questions display a spike on the 19th March, with Real or Fake having the highest spike of 12 contributions. Pets and wildlife displays another 12 contribution spike on the 31st May 2011.

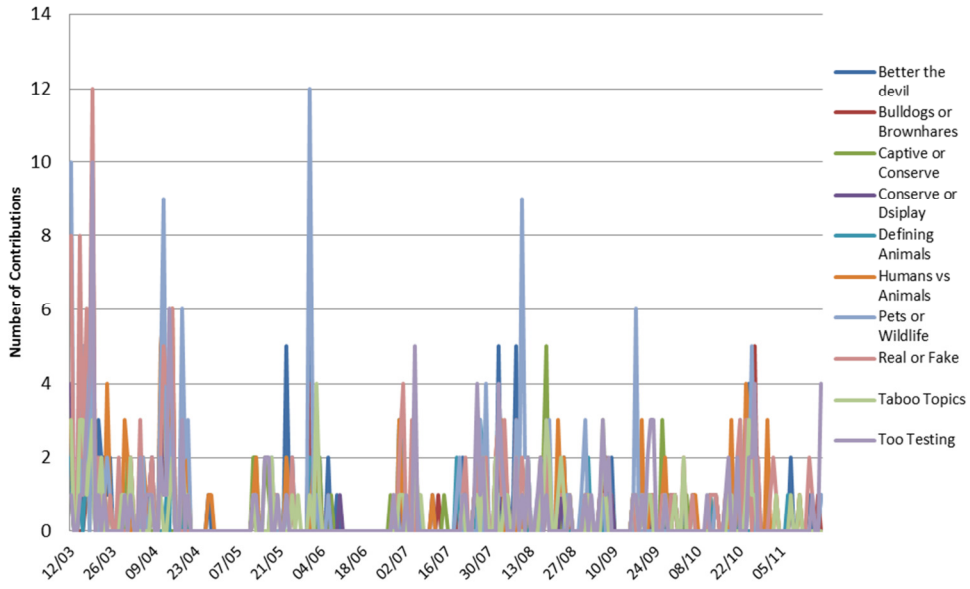



Figure 14: Comparative analysis of 'on topic' contributions by QRator question

When comparing the total number of visitor contributions against total number of visitors to the Grant Museum it is possible to see that, assuming visitors make no more than one contribution per visit, 29% of visitors make a contribution to QRator. This assumption may not be accurate, as demonstrated by data from April, where the number of visitor contributions were slightly higher than the number of visitors. After an initial surge in visitor numbers after the museum opening in March, there was a decline in overall visitors in April. Anecdotal evidence does suggest, however, that the visitor figures may not be accurate in April, due to event visitors being quantified separately to

standard visitor figures (Ashby 2012 pers. comm. 16th March 2012). The general trend, however is of increasing visitor numbers over the peak summer season, with a maximum of 1436 visitors seen during August (Figure 15). In comparison, visitor contributions to QRator saw a small rise shortly after opening, so that there were more contributions than visitors in April. Throughout the remainder of the 9 month study period, visitor contributions remained steady, if fluctuating slightly. This suggests that 1 in 3.35 visitors to the museum choose to leave a contribution on one of the QRator iPads (Figure 16). It would be expected that during the rise in visitor numbers during the peak season of June to September that the number of visitor contributions would also increase. This is not the case. This suggests that less people contribute proportionately in busy periods, and the reasons for this could be due to the museum environment not being conducive to contributing in busy spells, in comparison when there is more time and space to contribute during quieter periods. This could explain the reasoning why there were more visitor contributions in April, as there were less visitors in the museum.

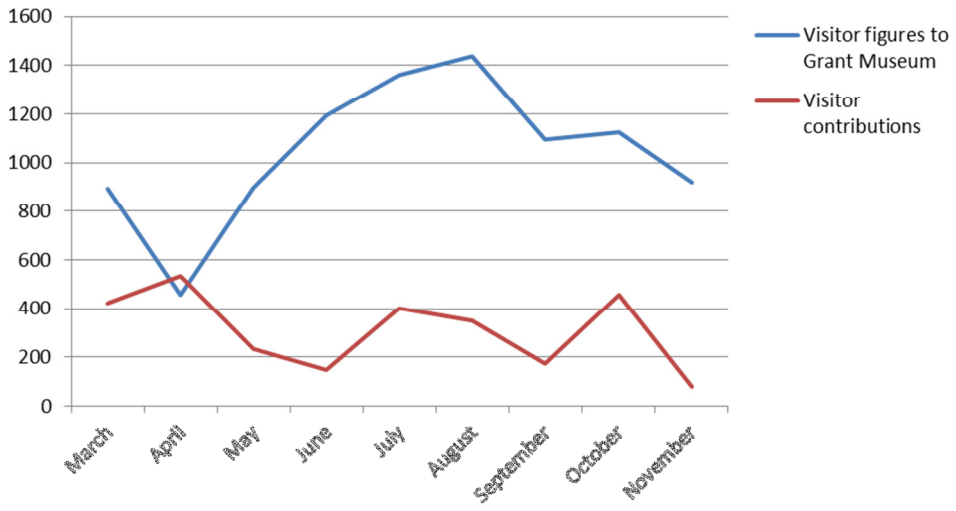



Figure 15: Comparisons between total number of visitors to the Grant Museum, and total number of visitor contributions on QRator

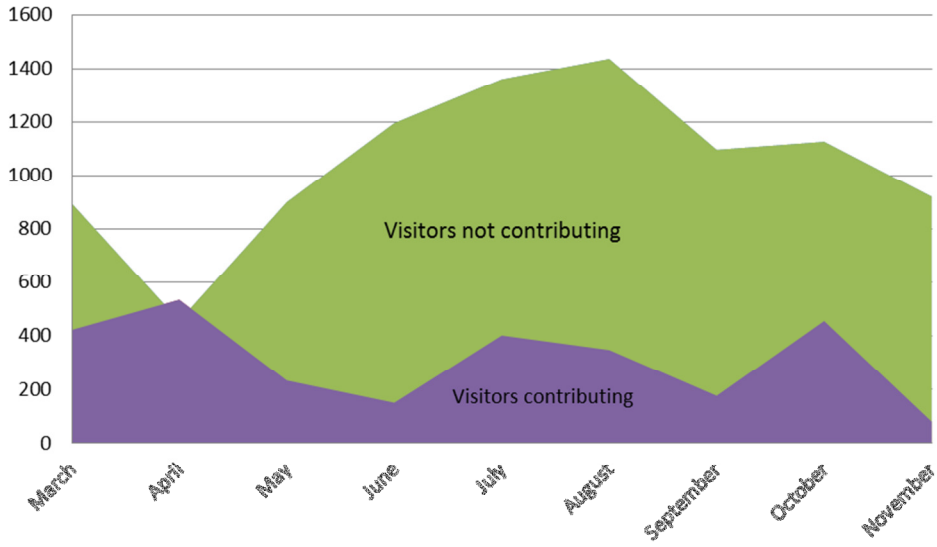



Figure 16: Number of visitors contributing to not contributing

Text analysis tools were also used to interrogate the corpus of visitor contributions. The analysis of visitor comments is similar to that of other kinds of texts and qualitative research data and is therefore, in principle, open to many of the analytical techniques that are employed for textual analysis in other contexts (Macdonald 2005). It was assumed that frequent terms from QRator would reflect the topics and

themes being discussed in the physical museum space. The QRator data was run through a commonly used text analysis tool Voyant[108], to highlight the commonly used words in the visitor contribution, and to enable a Sentiment Analysis using SentiStrength[109] to take place. The most frequent words in the corpus seem to highlight positive visitor contributions as well as the key topics discussed the natural history specimens, the museum, and the action QRator is encouraging visitors to undertake: animals (288), like (218), museum (186), think (159), love (148). The length of comment may also be used as an indicator of engagement, if we assume that those who are interested in an issue or topic may wish to write at greater length. Indeed the average length of comment increased significantly between categories. The noise category had an average of 4.1 words, comments on the museum had 7.4 words and visitor contributions on topic had an average of 15.4 words. This is pleasing, since it suggests that visitors were inspired by the questions to engage with topics in a relatively complex fashion. Additionally, when compared to the SentiStrength results, which classifies for positive and negative sentiment on a scale of 1 (no sentiment) to 5 (very strong positive/negative sentiment), this highlights that the comments on the museum were in average more positive in sentiment (2.04 positive) whereas the comments on topic had an equal positive to negative response (1.52 positive; 1.55 negative). This, in turn, Suggests more engaged texts often contain a

[108] Voyant Tools is a web-based reading and analysis environment for digital texts. http://voyeurtools.org
[109] http://sentistrength.wlv.ac.uk

mix of positive and negative sentiment, in contrast to less engagement which is more likely to produce a single sentiment result.

## 4.5 ANALYSIS OF OBSERVATIONS

Tracking visitor movement and behaviour in the Grant Museum during the observation period highlighted that visitors were quite methodical in their movements around the exhibition space, viewing all of the cases with equal interest. On average, visitors spent 20.1 minutes in the Grant Museum; the shortest visit time observed was 3 minutes and the longest 53 minutes (Table 10). With the largest proportion of visitor observed remaining in the gallery space for more than 21 minutes (Figure 17).

| date | Visitor observation number | entry time | exit time | Dwell time in gallery (minutes) |
|---|---|---|---|---|
| 29th September 2011 | 1 | 13:00 | 13:05 | 5 |
| 29th September 2011 | 2 | 13:07 | 13:32 | 25 |
| 29th September 2011 | 3 | 13.14 | 13:48 | 34 |
| 29th September 2011 | 4 | 13:54 | 14:09 | 15 |
| 29th September 2011 | 5 | 14:38 | 14:47 | 9 |
| 29th September 2011 | 6 | 14:42 | 14:55 | 13 |
| 29th September 2011 | 7 | 14:55 | 15:11 | 16 |
| 29th September 2011 | 8 | 15:06 | 15:25 | 19 |
| 29th September | 9 | 15:17 | 15:28 | 11 |

| 2011 | | | | |
|---|---|---|---|---|
| 29th September 2011 | 10 | 15:28 | 15:38 | 10 |
| 30th September 2011 | 11 | 13:03 | 13:31 | 28 |
| 30th September 2011 | 12 | 13:17 | 13:36 | 19 |
| 30th September 2011 | 13 | 13:34 | 14:27 | 53 |
| 30th September 2011 | 14 | 14:19 | 14:22 | 3 |
| 30th September 2011 | 15 | 14:28 | 14:34 | 6 |
| 30th September 2011 | 16 | 14:48 | 14:57 | 9 |
| 30th September 2011 | 17 | 15:05 | 15:39 | 34 |
| 30th September 2011 | 18 | 15:23 | 16:05 | 42 |
| 30th September 2011 | 19 | 15:27 | 16:09 | 42 |
| 30th September 2011 | 20 | 16:10 | 16:26 | 16 |
| 30th September 2011 | 21 | 16:21 | 16:36 | 15 |

Table 10: Observed visitor dwell times in the Grant Museum

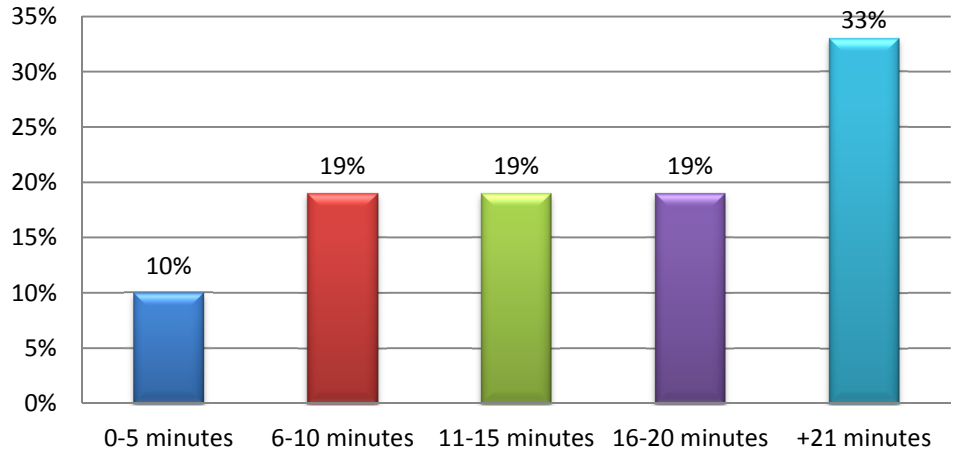



Figure 17: Observed visitor dwell time in categories for the Grant Museum

The visitors observed displayed moderate to extensive engagement with the specimens on display. As all visitors displayed high levels of engagement behaviours this amounted to looking at objects with intense interest and participates fully, exploring and experimenting in the museum experience.

Timing and tracking has become one of the most consistently used methods in exhibition evaluation, but as Serrell (1997) notes, there are no systematic shared methods to judge impact and no standards to measure success against. Museums professionals are continually looking for better ways to assess impact (Crane 1994; Serrell 1997; Hooper-Greenhill 2002; Scott 2003; Scott 2006). Timing and rating basic engagement level during the visit has enabled us to gain an basic insight into visitor behaviour and levels of engagement in the case study museum spaces in order to provide a context for understanding any possible impact of visitor generated content technology on visitor experience, but it cannot be said to provide a clear understanding of characteristic behaviours, engagement or impact of the technology. Even though the use of tracking and timing methodologies allow researchers to capture the basic holding power of exhibits, these fail in capturing the actual interaction emerging among the visitors, as well as and between the visitors and the exhibits (Allen 2002). A number of studies have been undertaken in order to develop a detailed idea on what visitors experiences look like and entail. Although a lot is known about what visitors experience looks like, there is surprisingly little

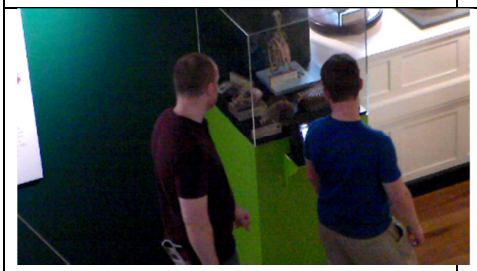
literature about what visitors actually do and say when they encounter the exhibits (vom Lehn and Heath 2006; Meisner et al. 2007; Davies and Heath 2013). Therefore, it is not possible to fully comprehend the processes involved in the shaping of experience at the exhibit-face (vom Lehn 2002). To explore this active interaction the following section focuses on the capturing and analysis of visitors gestures and behaviours with the visitor generated content technology to gain a deeper understanding of visitor behaviour and engagement levels at the exhibit-face.

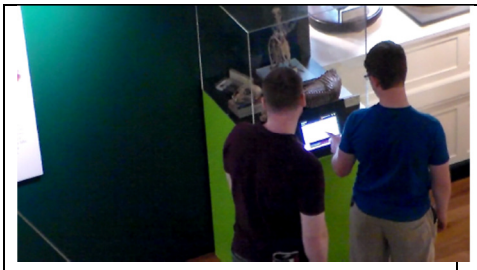
## 4.6 ANALYSIS OF VIDEO-BASED OBSERVATIONS

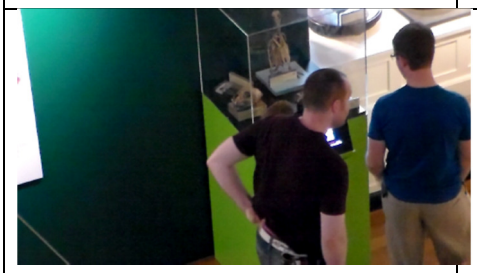
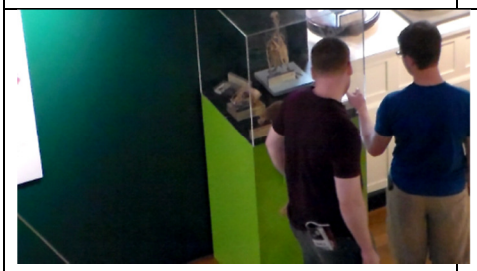
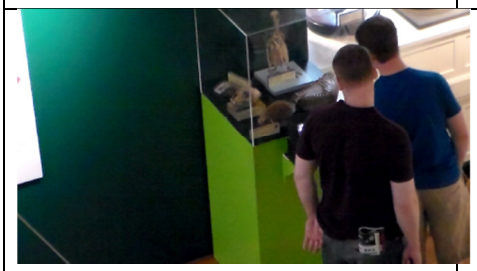
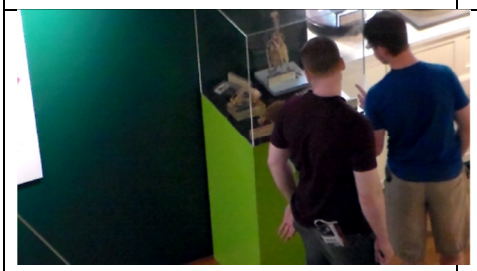
Research on visitors' responses to exhibits still view stopping and viewing power as the prime measurements to determine the effectiveness of exhibits (for example Borun et al. 1997; Falk and Dierking 2000; Davies and Heath 2013). However, as we have discussed in chapter 3 and appendix 4, it appears that current investigations of visitor behaviour largely ignore the actions and activities that visitors produce while they view and examine an exhibit. Whilst measurements like stopping and viewing power provide important information about visitor behaviour in exhibitions they do not reveal how visitors organise their actions and activities at the exhibit-face.

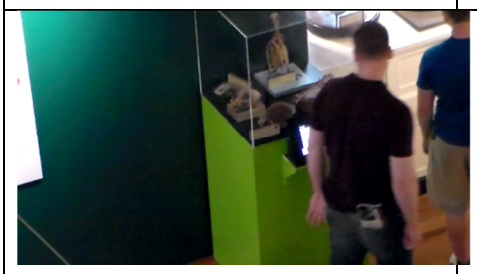
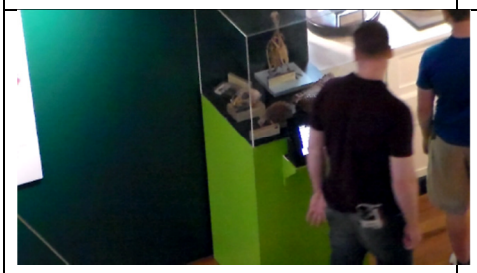
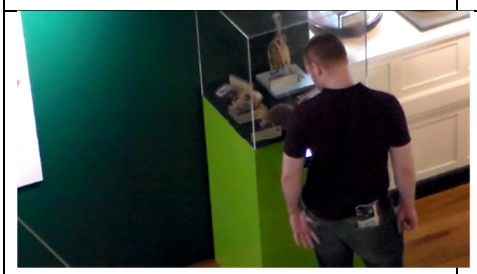
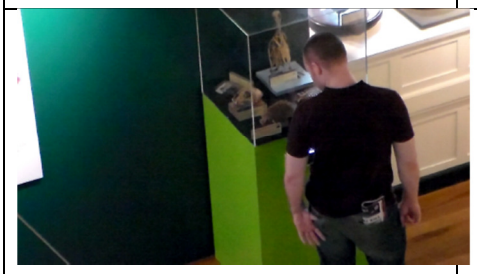
This section discusses a two key video fragments to begin to unpack how visitor's use of gaze, gestures and posture whilst approaching, examining and interacting with the QRator visitor generated content technology can highlight about visitor engagement. The fragments discussed in this section have been selected because they provide particularly clear instances that are used to reflect upon common themes (Heath and vom Lehn 2004; vom Lehn and Heath 2006; vom Lehn 2010) of levels of engagement that this section explores.

For the purpose of this exploratory video-based study moderate engagement is categorised as when a visitor looks or studies with apparent interest; and/or touches, and participates in the activity with attention. The following fragment transcript (Table 11) two adult visitors approach the Touching? QRator iPad in the Grant Museum, one of the adult visitors continually uses pointing gestures to communicate with the second adult visitor.

| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:01.1 | Two adult visitors (AV6 and AV7) approach tablet and object case from the left. |

| | | |
|---|---|---|
|  | 0:01.1 - 0:01.2 | Both turn to face tablet screen, AV6 points to centre of screen. |
|  | 0:01.1 - 0:02.5 | AV6 uses a pointing gesture to highlight another area of the screen. AV7 looks at screen. |
|  | 0:02.5 - 0:03.6 | AV6 touches 'right arrow button' screen changes to next screen displaying visitor comments. |
|  | 0:03.6 - 0:06.7 | Both AV's gaze is focused on tablet screen. |
|  | 0:06.7 - 0:09.0 | AV6 points at a visitor comment on screen, and moves finger across screen, continuing the pointing gesture. AV6 shift in posture moves slightly |

| | | |
|---|---|---|
| | | away from screen. |
|  | 0:09.0 - 0:10.3 | AV7 looks to the right, AV6 gaze focused on case, points to specimen in case, AV7 turn head to look where AV6 is pointing. |
|  | 0:10.3 - 0:11.7 | AV7 turns body towards case, AV6 still pointing at specimen in case, both AV's are focused on case. AV1 leans over to get a closer look at specimen. |
|  | 0:11.7 - 0:13.3 | AV7 changes stance to see the specimen more clearly. AV6 points at specimen in case. |
|  | 0:13.3 - 0:16.3 | AV6 continues to point at specimen in case, AV7 gaze is focused on case. 0:15.5 AV6 stops pointing gesture, and turns to walk away |

| | | |
|---|---|---|
| | | from case, AV6 starts to walk away to the right. AV7 remains focused on the case. |
|  | 0:16.3 - 0:17.3 | AV7 takes a step to the right, still gaze is focused on the case. AV6 continues to walk away from tablet. |
|  | 0:17.3 - 0:18.2 | AV7 takes a step back towards the tablet, gaze focused on case. |
|  | 0:18.2 - 0:19.2 | Pauses and gazes looks down towards different specimen. |
|  | 0:19.2 - 0:26.9 | Gaze remains focused on specimen in case. |

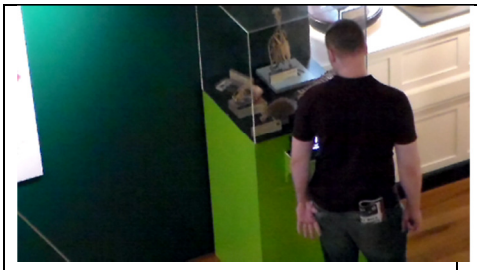
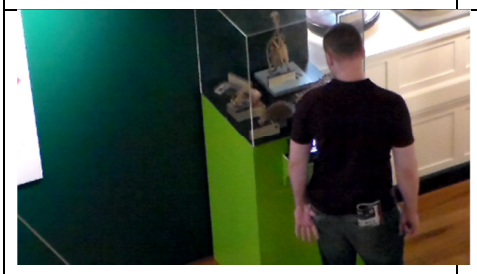
| | | |
|---|---|---|
|  | 0:26.9 - 0:31.3 | Head turns to another specimen in case, slight changes in posture. |
|  | 0:28.4 - 0:30.4 | Gaze focused on case and then turns right and walks out of shot. |

Table 11: Transcript of moderate engagement at the Touching? QRator iPad at the Grant Museum of Zoology

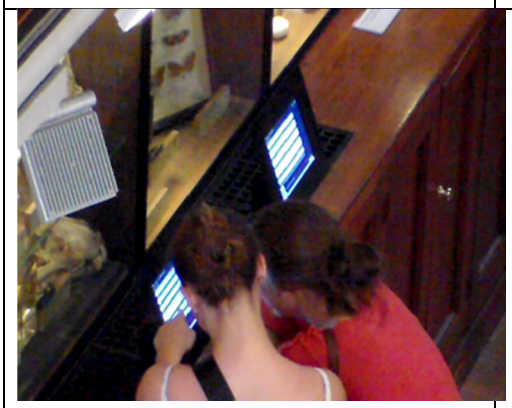
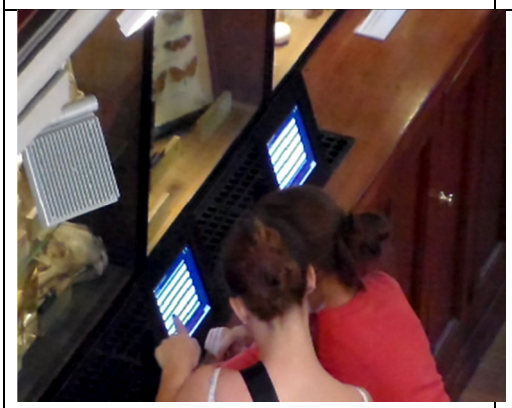
Pointing gestures are used extensively in this example fragment. Adult Visitor 6 repeatedly uses his index finger as a vector to carry out pointing gestures to Adult Visitor 7. Pointing and index-finger pointing in particular, "is characterized by an arm and index finger extended to the direction of an interesting object, with the other fingers curled under the hand and the thumb held down and to the side" (Masataka 2003, p.69). Besides the index finger as a vector indicating an article of interest or reference, the head, lips, eyes, arms, gaze, torso shifting, elbow and feet can be also used (Clark 2005). Kendon and Versante (2003) have further argued that choosing a vector to carry out a pointing gesture is not a random occurrence but rather, a choice based on the performer's explicit desire to indicate the locus in a specific way.

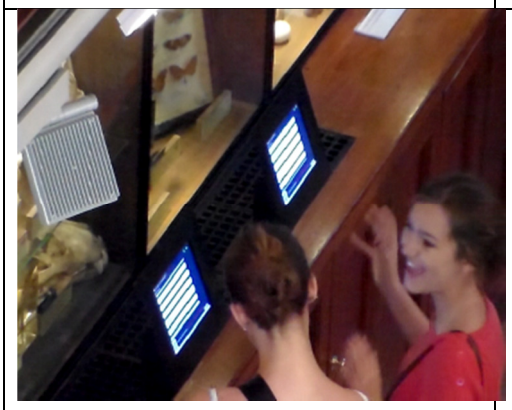
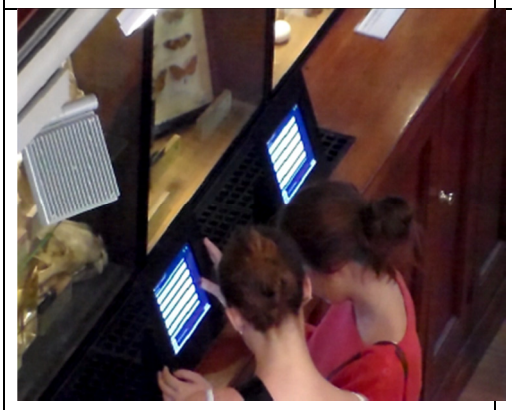
Pointing depends on at least two participants: the sender attempts to communicate a meaning to the addressee and establish a particular space for cognition and action to take place (Goodwin 2003). The addressee should first attend the sender and follow his/her gestures or verbal cues in order to locate the indicated 'demonstratum' (Clark et al. 1983). Once the addressee locates the demonstratum, their orientation normally changes, as they shift to the indicated focus of attention. This can be seen clearly in the interaction behaviours and gestures between AV1 and AV2. When AV1 uses a pointing gesture, AV2 changes his orientation in order to focus his attention on the object of the pointing gesture. Therefore, pointing can be seen as a social and communicational act, functioning as a prompt calling for a response from the participants involved in interaction (Kita 2003).

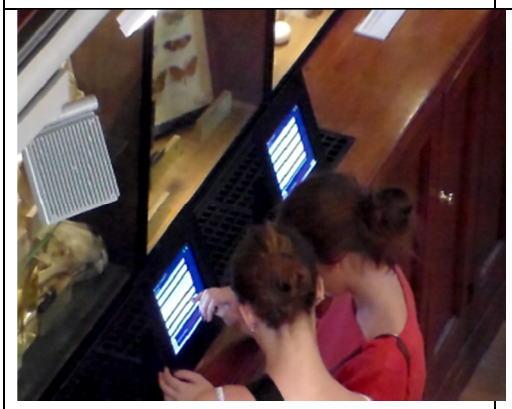
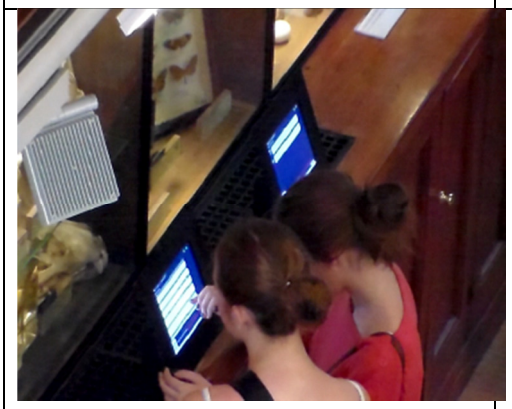
Pointing in this fragment can be seen as an alternative means to the verbal referential expressions of location description or feature description as it involves minimal collaborative effort and less or almost no involvement of naming, which can be extremely difficult in the museum when encountering unfamiliar objects. Specifically, pointing gestures seem to speed up the pivotal process of the identification.

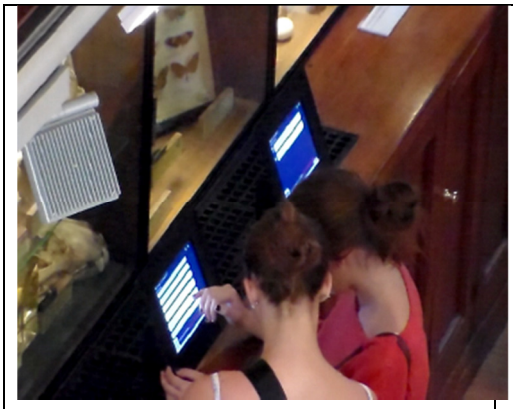
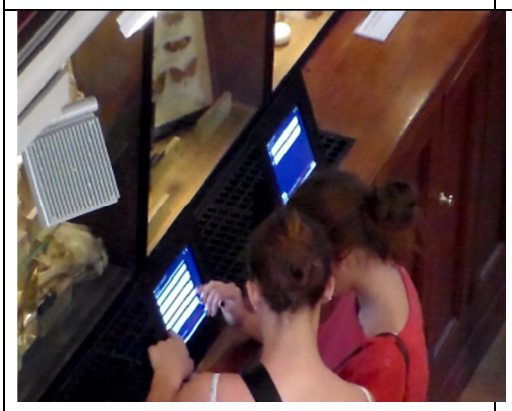
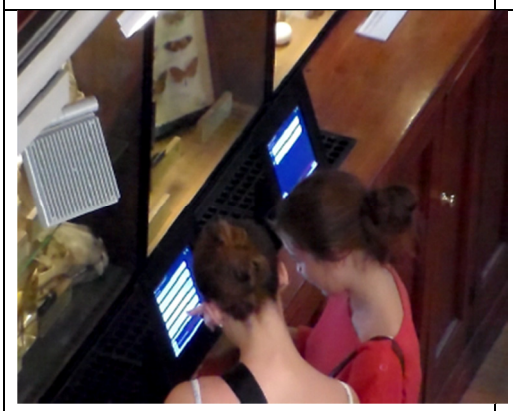
The next fragment highlights (Table 12) extensive engagement between two visitors who are focusing on the visitor comment screen of the Is Domestication Ethical? QRator iPad in the Grant Museum of Zoology. Extensive engagement is categorised as when a visitor looks or studies

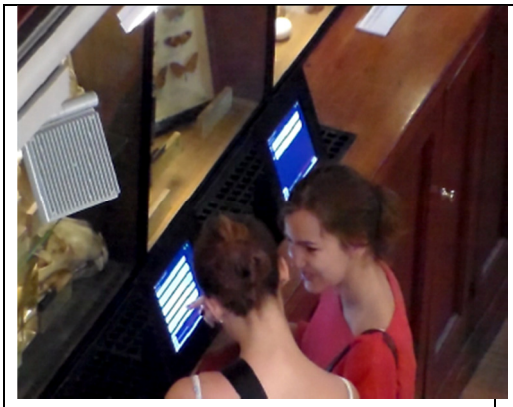
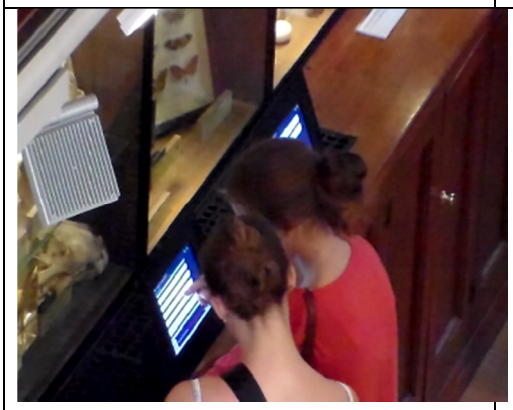
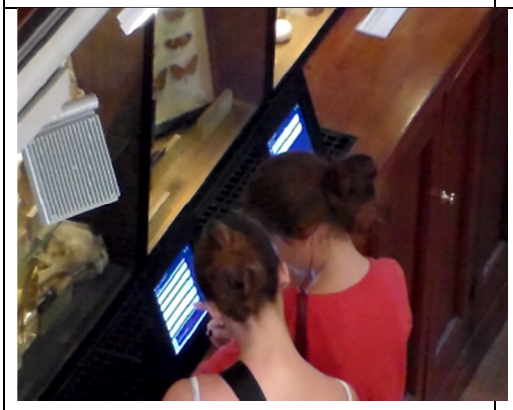
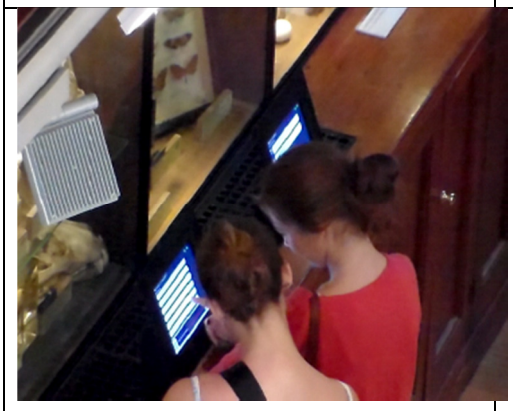
with intense interest and/or participates fully, exploring, and experimenting.

| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:01.4 | Two adult visitors (AV2 and AV3) are looking at the iPad screen. AV2 points at visitor comment on screen, both visitors have a verbal discussion. |
|  | 0:01.3 - 0:06.9 | Slight changes in positioning for both visitors. AV3 moves closer to AV2 to see what AV2 is focusing on. AV2 uses a pointing gesture towards another visitor comment on |

| | | |
|---|---|---|
| | | the screen. |
|  | 0:06.9 - 0:09.4 | AV3 in response takes a step back and during a verbal dialogue with AV2 makes a big open hand gesture with both arms. AV3 then smiles and looks directly at AV2. |
|  | 0:09.4 - 0:11.7 | AV3 turns her head back towards the iPad screen, gaze is focused on screen. AV3 begins to scroll the comments upwards using her right hand thumb. AV2 gaze is focused on the screen. |

| | | |
|---|---|---|
|  | 0:11.7 - 0:15.7 | AV3 continues to scroll the comments screen with her thumb, then changes hand positioning to scroll the screen with her little finger. |
|  | 0:15.7 - 0:20.1 | Both AV's are focused on the screen (appearing to be reading the visitor comments), AV2 briefly looks at the specimens in the case behind the iPad, then turns gaze back to the iPad screen. |

| | | |
|---|---|---|
|  | 0:20.1 - 0:22.5 | AV3 continues to scroll comments on screen, while AV2 focuses on screen. |
|  | 0:22.5 - 0:26.2 | AV2 points to a comment on the screen, both gaze downwards, AV3 continues to scroll. Appear to be having a verbal dialogue. |
|  | 0:26.2 - 0:31.4 | AV3 points to a different comment on the screen. AV2 shifts posture to view comment more clearly. |

| | | |
|---|---|---|
|  | 0:31.4 - 0:33.3 | AV3 turns her head to face AV2 and smiles, then turns back to re-focus on the iPad screen. |
|  | 0:33.2 - 0:37.0 | AV3 begins scrolling the comments on the screen using her index finger. |
|  | 0:37.0 - 0:39.5 | Both AV's tilt heads slightly, still focused on the screen. |
|  | 0:39.5 - 0:50.0 | AV3 points to a comment, verbal dialogue, scrolling of screen, slight shifts in posture by AV3, AV2 remains |

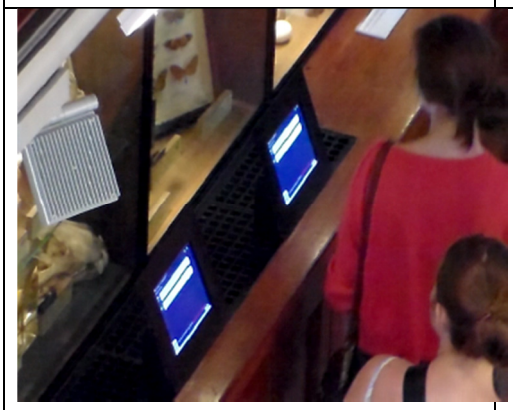
| | | |
|---|---|---|
| | | stationary, gaze focused on screen. |
|  | 0:50.0 - 0:57.7 | *screen changes to next screen* AV2 moves closer to AV3 to view the screen. Both turn to the right and walk out of shot. |

Table 12: Transcript of extensive engagement at the Is Domestication Ethical? QRator iPad at the Grant Museum of Zoology

Adult Visitor 2 and 3 are focused and engaged with the content on the QRator iPad and both play roles in sending and receiving behavioural gestures to one another. Pointing and hand gestures are used throughout this fragment highlighting the social and communicational act being undertaken by both visitors. Their gestures suggest an element of enjoyment when scrolling through and reading the visitor contributions on the QRator iPad. Their pointing gestures, interactions with the iPad and behavioural gestures are focused throughout the fragment on the content on the QRator screen and each other. This suggests that they are both actively engaged in the experience.

## 4.6 CONCLUSIONS

This chapter described a study of visitor contributions to the QRator application installed in the Grant Museum of Zoology, UCL. It aimed to address the first of the research questions focusing on how digital visitor generated content impacts on visitor engagement within a museum context. Firstly the chapter explores the use museum digital visitor contributions as a source of information on visitors' engagement with and understandings of museum content and the impact of digital technology on visitor engagement and then goes on to explore how visitor's use of gaze, gestures and posture whilst approaching, examining and interacting with the QRator visitor generated content technology can highlight visitor engagement. The analysis revealed the following issues regarding the use of visitor contributions, observations and video-based observations as data sources to analyse the impact of digital technology on museum visitor experience.

A significant proportion (41%) of visitor contributions entered into the QRator iPads in the Grant Museum expressed a direct response to the prompt question asked about theme and specimens within a 'QRator case'. Where these comments seem to reflect a degree of consideration, the visitor has engaged with the object in a different and potentially additional way to other visitors. In some circumstances their responses suggest that such an interaction has increased their sense of

engagement and connectedness both to the particular object, topic and to the museum in general. For example, a visitor to the Grant Museum, in response to the question "Every medicinal drug you have ever taken was tested on animals. Is this a necessary evil?" placed next to the Too Testing case (Figure 18), wrote: "I would rather it was tested on animals than humans. The conditions and situation would have to be decent. If sacrificing a couple of rabbits helps find cures for the worst diseases then the sacrifice is worth it. Testing fragrances etc is wrong on animals, only were no viable subject can be found should animals be used. In the future i am sure that genetically grown skin cells etc will replace animals." (sic). And another visitor wrote, "I am a diabetic kept alive by injected insulin. Animals were involved in testing and supplying insulin for treating human, although some insulin is now produced from plants by GM methods but such insulin can be unsatisfactory for some so the animal supplies keep some of us alive. Do you want to take away my pork insulin?" These sorts of comments suggest that for some visitors, the invitation to offer their perspective encouraged them to relate to the collection in a personal and considered way. Additionally these exceptionally well considered responses certainly add to the debate the Grant Museum is trying to create.

Too Testing?

Every medicinal drug you have ever taken was tested on animals. Is this a necessary evil? In the process of developing new medical drugs, UK legal regulations require them to be tested on mammals before they are tested on human subjects. The argument is that an untested drug's effect on living organs can only be tested on a living animal, and the risk is too high at this stage to chance on a person. Is this justifiable?

Figure 18: Too Testing QRator case and question text

A significant number of visitor contributions posted via the QRator iPads expressed a positive response to the museum and the experience it offers. Although many of these contributions were banal (e.g. "This museum is innnsaaaaaaaneeeee"; "This place is cool"), some were more considered and focused on personal highlight objects ("So far the dinosaur bones, Walrus penis bone and the jar of moles have been my highlights. Wish i'd been brought here as a kid, i'd have loved it!", and "I liked the pufferfish and porcupine fish skulls.:-)"). Although this sort of commentary was not the intended output of the QRator project, which aimed to encourage interpretation of the museum specimens and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged

by the museum. These visitor contributions indicate that the QRator iPads are a major facilitator in engendering engagement between visitors and the museum. The iPads engage some visitors, merely by their existence as material objects in the museum space, and then working with the visitor and the museum as a further actor resulting in a response which neither is about the object generally or a response the prompt question positioned on the kiosk screen. A major aim of the QRator project was to challenge what can be said in terms of interpretation, moving from object specific fact based interpretation towards larger concepts and questions, in order to open up a dialogue about zoological objects in a museum setting (Carnall et al. 2013, p.57). It was hoped that QRator would complement the existing interpretation in the Grant Museum which present facts about the organism or group of organisms, including details of diet, habitat, conservation status and ecology of specimens (*ibid.*). The analysis suggests this has certainly been achieved. Using museum specimens not to represent a type, but to highlight an issue, concept or theme aligned to an associated question relating to museum practice, natural sciences or zoology, has allowed the museum and the visitors to see the Grant Museum collections differently. Carnall et al. (2013, p.66) believe that social, history and art museums are more advanced in their interpretation strategies than natural history museums, and have been investing in social object (Simon 2010, pp.127–172) interpretation that highlights that objects could and, more importantly, should spark debate and become talking

points “rather than act as avatars of a fixed set of facts” (Carnall et al. 2013, p.66). QRator has introduced this concept to the Grant Museum.

This project demonstrates that the Grant museum environment is conducive to wider discussions about the role of science in society. While none of the QRator topics are out of place in a natural history museum, issues about the ethics of eco-tourism, zoos, cloning, domestication and resources for conservation, for example, have rarely been tackled by the sector, and where they have it has normally been in events, which give topics only an ephemeral focus and for a limited audience (Carnall et al. 2013, p.66). Asking people to contribute to conversations on these issues in a scientific institution such as the Grant opens up debates that are often restricted to specialist disciplines to a wider public. Many museums have been hesitant to open up communication to greater participation by visitors and as Lynch (2013a, p.10) points out, there are fundamental issues of public participation and the complex implications of opening up of museum collections for public scrutiny has been largely unexamined. The concept of trusting audiences and encouraging visitor participation in interpretation runs contrary to the traditional ideas of museum authority and communication (Lynch and Alberti 2010). There appears to be within the museum profession an ingrained fear that visitors will leave inappropriate comments when there is no moderation or intervention by the museum (Russo and Watkins 2007). This is despite research showing that museum visitors want to

engage with complex, controversial topics by making comments or talking to staff and other visitors (Kelly 2006) but there have rarely been mechanisms in place to allow visitors to do so. Through the QRator project it appears that the Grant Museum has begun to embrace the concept of 'radical trust' (Fichter 2006) in the visitor community. By offering opportunities for visitors to consume and co-create digital interpretation, the Grant Museum has taken a proactive role in developing new narratives around museum collections, enabling direct experience of content production. There may be unanticipated consequences in relinquishing authority and utilising radical trust in this way, consequences that we cannot yet predict, but, by focusing on the positive the radically trusting museum has the potential to be part of the 'participatory sphere' (Cornwall and Coelho 2007, p.8) where individuals can share experiences and participate on equal terms.

QRator has provided a platform to help to discover visitor stories and experiences and share them with a wider audience, providing a broader, more personal interpretation of the Grant Museum collections. This new co-creation of interpretation has enabled us to highlight visitors' active role in creating meaning of their own museum experience. Each visitor has their own agenda, identity, motivation and interests, and will approach the museum with different perspectives (Ross et al. 2013). As a result, visitors are able to share their own 'digital stories', narratives constructed from their own interpretation

of museum collections. Historically, visitor participation projects have been criticised for a number of valid reasons (Lynch 2011 provides a summary). Criticisms include that visitor participation projects are "rubber stamp exercises" (Lynch 2011, p.12) in which participants experience "empowerment-lite" (*ibid*, p.20) experiences at the level of consultation rather than collaboration; projects are typically short-term; generate false consensuses; use unrepresentative subgroups and that visitor participation projects are peripheral to key strategy work. QRator aimed to minimise such biases (for example, by inviting 100 per cent of visitors to comment, and by making all their responses freely available) (Carnall et al. 2013), but ultimately we question the extent to which bias can be eliminated, due to the self-selecting nature of the visitors who choose to take part in the QRator experience. As Carnall et al. (2013) suggest all of these things rely on an element of trust being left with museum staff carrying out the dissemination or change of practice (Carnall et al. 2013, p.68). One of the major aims of the QRator project was to create a platform for the Grant Museum visitors to feed their opinions into our decision-making processes. Many of the questions relate to issues of museum management and how collections should be used. For example, one QRator question raised the issue of collections use vs. storage in perpetuity:

> How do we balance the needs of our specimens and the desires of our visitors?

> Most objects on display are irreversibly damaged by exposure to light, dust and fluctuations in temperature and humidity. The longer they are on display the shorter they will last. Instead, specimens in storage will last longer without requiring conservation treatment and care; however, visitors would not be able to readily see the specimens. Without specimens there wouldn't be a museum.

Answers to this question will help the Grant Museum staff to decide the extent to which the museum use stored collections in future rotating displays, which is something they genuinely want to know from visitors. Similarly, visitor responses to the question 'Is it ever acceptable for museums to use replicas?' can help shape how displays are created and what objects are acquired for teaching, outreach and public engagement. The QRator application received a huge number of visitor responses on questions like this, but we are not convinced that the visitors realise that their input will go on to inform decisions made by the Grant Museum: despite signage in the museum communicating our intent there is little guarantee or available evidence that these are read. Jack Ashby states;

> "What I don't know, or know how important it is, is if the average museum visitor knows that QRator or projects like it are experimental or that there is a research programme behind it. It is important potentially for ethical reasons that visitors know that their data could be used for research. I think visitors would

> find it interesting that digital innovation projects are experimental, and the visitors are the guinea pigs, but I don't know how aware visitors are of this (despite signage in the museum stating such)." (Ashby 2013 pers. comm. 25th November).

It is unclear if visitors realise that it is the museum that is asking the questions. One possibility is that visitors are used to thinking of the front of house staff as being far removed from how the 'real' museum works behind the scenes, and do not automatically think that they can feed into how the museum is run. Potentially the abundance of museums utilising what have been classed as 'shallow interactives' (Hornecker and Stifter 2006, p.135) and the common conception that technology is a threat "competing with the objects themselves for the visitors' attention" (Beard 2013) has ruined the market for this new breed of social participative interpretation and it will take a while for the transformation to take place. Nevertheless, it is important to stress that due to the visitor responses to the QRator questions, the Grant Museum is transforming its practice and behaviour which is a very positive outcome of the project.

It is believed that the QRator project represents a shift in how cultural organisations act as trusted and authoritarian institutions; communicate knowledge to the community; and integrate their role as keepers of cultural content with their responsibility to facilitate access to content. Analysis suggests that visitors are willing to take part in a

dialogue, and express their views about their visit and individual object via digital technologies. It further suggests that in most cases they can be trusted to do so in a thoughtful, serious fashion, in this museum environment at least. There are drawbacks however. It is not possible to quantify individual visitor contributions, so it is impossible to comment on whether or not visitors are adding more than one comment to QRator. The challenges that digital technology and participatory media bring to museums demonstrates a change from a one to many transmission to a many to many interaction, in which museums use their own voice and authority to encourage participatory communication and content creation with visitors. The growing emphasis on the interactional and informal nature of learning in museums provides the perfect opportunity to investigate the impact of digital technologies as resources for engaging visitors in exhibits and more generally in museums as a whole (Thomas and Mintz 1998; Marty and Burton Jones 2007; Heath and vom Lehn 2010).

This chapter aimed to explore how digital visitor generated content impacts on visitor engagement within a museum context. Undertaking open coded content analysis on the digital visitor generated content was found to be a useful method for revealing and understanding visitor experience. Archiving the visitors' responses and transferring the data to CSV files enabled large volumes of data to be sifted through with relative ease in a systematic fashion. This technique is relatively resource heavy, as a museum will need to factor in resource allocation

to enable open coding to take place. Nevertheless it has been found to be a useful technique for allowing the Grant Museum to discover and describe the focus of individual visitor attention. Content analysis of digital visitor generated content is limited by availability of material; however, observed trends from digital visitor contributions may not be an accurate reflection of all visitor experiences, therefore it is important to take this into consideration when discussing results. This analysis has been carried out within a specific context at the Grant Museum. However, it can be applied to different museum digital elements, exhibitions, events and activities or to non-digital visitor participation and wider causes like understanding how the museum brand is perceived by the public. This type of digital visitor contribution analysis can also be applied to other digital platforms where the museum may have a presence, including social media platforms such as Facebook, Twitter, Instagram, or YouTube, and where users comment about the museum and its activities; but the particularities of each individual platform should always be taken into account. Further work is needed to experiment and apply research methods to digital visitor generated content in order to continue to define the metrics and to set the ground for drawing comparisons among different cases within the museum sector.

This research has demonstrated that digital visitor contributions can provide valuable information about visitor use of digital technology in the museum space. The open coded content analysis provides a better

understanding of the contribution patterns and interaction behaviour of Grant Museum visitors, and provides a valuable guide for developing and understanding of visitor engagement and the impact of digital visitor generated technology in museums. In addition to studying textual visitor contributions, undertaking observations and video based observations as a way to explore the physical gestures shaped by gaze, hands, and posture, through which visitors make and share their experiences has been useful for gaining a basic insight into visitor behaviour and levels of engagement, but it cannot be said to provide a clear understanding of characteristic behaviours, engagement or impact of the technology. The video-based observations findings however, do begin to contribute to an understanding of the visitor engagement process and the realisation that multiple contexts in which even a brief encounter with a digital visitor generated content application occurs. Utilising both analysis of visitor contributions and micro analysis of video observations has begun to provide a valuable guide for further development and combining and refining methods to assess the impact of digital visitor generated content in museums.

# CHAPTER 5: STUDY OF VISITOR GENERATED CONTENT IN THE IMPERIAL WAR MUSEUM LONDON

The Social Interpretation Project was developed and implemented in Imperial War Museum London (IWM) in 2011-2013 to explore the possibilities of digital visitor generated content enabling new mechanisms for visitor engagement. It was delivered as part of the Digital Research and Development Fund for Arts and Culture, a partnership between the Arts Council England, Arts and Humanities Research Council (AHRC) and National Endowment for Science, Technology and the Arts (Nesta). Social Interpretation (SI) was designed to enable IWM to facilitate discussion about, and the sharing of museum objects by visitors. The genesis and timeline of SI bring two key issues into focus for this thesis; firstly, the impact of digital visitor generated content has on visitor engagement and secondly, the challenges digital innovation projects can bring to a large cultural organisation, like IWM.

The aim of the study described in this chapter was to obtain an initial understanding of the research question: how digital visitor generated content impacts on visitor engagement within a museum context. This chapter presents and discusses the digital visitor generated content application, Social Interpretation, and the results from the second case study of digital visitor generated content in museums where data was collected by archiving visitor contributions. It provides an overview of

how the bespoke digital visitor generated content system; Social Interpretation was designed, tested, implemented and evaluated within IWM London. The remaining chapter is divided into 5 sections. The first section introduces the setting where the data collection took place. Section two describes the digital visitor generated content application: Social Interpretation. The third section explains the data collection and analysis methods used. Section four presents the analysis and results of the data. Section five discusses the findings.

This study documents the findings of a twelve month collaborative research project focusing on the Imperial War Museum's (IWM)[110] development and implementation of the Social Interpretation (SI) project. The SI project utilised Research and Development (R&D) and innovative practices, including agile project management principles and a user centred approach to fundamentally challenge the way in which museums interact with, and provide for, audiences.

The SI project aimed to apply the intellectual and technical models that have underpinned the success of social media to museum objects and interactions with the public, to offer new mechanisms for public engagement and the construction of social interpretation. The focus of SI is a participatory social system which allows visitors to interact with museum objects and create their own interpretations; facilitating social interpretation in the physical museum space and online; visitor content and personal narratives would subsequently become part of the

[110] http://www.iwm.org.uk/

museum objects history and the display itself. The project was based around technology developed by Knowledge Integration[111], a modular suite of software called the Collections Information Integration Middleware (CIIM)[112]. This enabled IWM to facilitate and share discussions about museum objects by visitors. Developed across three applications: online against 750,000 objects, in-gallery in the new *A Family in Wartime* permanent exhibition at IWM London and in the Main Exhibition Space in IWM North, and mobile: linking Quick Response (QR) codes (for definition of QR codes see Walsh 2009) to conversations about museum objects. This enabled members of the public to type in their thoughts and interpretation of museum objects and submit their interpretation to become part of the individual object's history and ultimately the display itself via the interactive label system to allow the display of comments and information directly next to the museum objects. Social Interpretation provides the opportunity to move the interpretation of objects from the static museum label to an open discussion making objects social with two-way public interaction in museum spaces. This research project aimed to investigate the real world application of social media participatory models with cultural institution output, focusing on the approaches to developing, implementing, evaluating and measuring the use and impact of social interpretation in the Imperial War Museums. This approach hoped to produce appropriate solutions by embedding users, stakeholders and

[111] http://www.k-int.com/
[112] http://www.k-int.com/products/ciim for further details on the CIIM see technical appendix 2.

the entire project team at every point of the development process, leading to advocacy and ownership. Ultimately the SI project created three applications and an underlying technical product to test if this innovative approach is a valid way to answer the challenges and opportunities that social media present to museums, galleries and cultural institutions. The project was a collaborative one between the Imperial War Museums (IWM), Knowledge Integration (KI), UCL Centre for Digital Humanities (UCLDH)[113] and Gooii[114], funded by the Arts Council[115], Nesta[116] and AHRC[117] Digital R&D Fund for Arts and Culture.

For the purpose of this thesis only the in-gallery aspects of the Social Interpretation project shall be considered. For technical details on the Social Interpretation system see appendix 2.

## 5.1 RESEARCH SETTING

This chapter presents and discusses the findings from the SI project implemented at the main branch of Imperial War Museums; Imperial War Museum London, Lambeth Road. The section below offers an overview of IWM London, where collection of data was undertaken, in order to introduce the physical structure of the exhibitions, and the institutional character of IWM through detailing their history.

[113] https://www.ucl.ac.uk/dh/
[114] http://www.gooii.com/
[115] http://www.artscouncil.org.uk/
[116] http://www.nesta.org.uk/
[117] http://www.ahrc.ac.uk/Pages/Home.aspx

Imperial War Museums (IWM), was established in 1917, and was initially tasked with documenting the First World War, which was still being fought. Based across five branches, IWM aims "to enable people to have informed understandings of modern war and its implications on individuals and society" (IWM 2010, p.4). IWM is unique in its coverage of conflicts, especially those involving Britain and the Commonwealth, from the First World War to the present day. IWM London is IWM's flagship branch due to the breadth, depth and impact of its six floors of exhibitions and displays. IWM was originally housed in the Crystal Palace at Sydenham Hill, with the museum opening to the public in 1920. In 1924 the museum moved to space in the Imperial Institute in South Kensington, and finally in 1936 the museum acquired a permanent home which was previously the Bethlem Royal Hospital in Southwark (Kavanagh 1988). Before the 2013-14 redevelopment of the museum[118], the floor plan of IWM London comprised of: the First and Second World Wars, and of conflicts after 1945 permanent galleries in the basement. The ground floor comprised the atrium and large exhibition space, the Family in Wartime gallery, a cinema, temporary exhibition spaces, and visitor facilities and cafe. The first floor included the atrium mezzanine, education facilities, and a permanent gallery, Secret War, exploring Special Forces and espionage. The second floor included the atrium viewing balcony, two art galleries, a temporary exhibition area and the permanent Crimes against Humanity exhibition.

[118] IWM London closed to the public initially for 6months on 1 January 2013 partially re-opened in Summer 2013 and then closed fully until July 2014. This is to transform the museum for the Centenary of the First World War, In July 2014 IWM London will reopen with new First World War Galleries and a newly configured atrium space.

The third floor housed the permanent Holocaust Exhibition, and the fourth floor accommodated the Lord Ashcroft Gallery.

The Social Interpretation project was installed in the *A Family in Wartime* exhibition, in IWM London. The *A Family in Wartime* exhibition opened in April 2012, IWM London's newest permanent exhibition, located on the building's ground floor and interconnected with, the Large Exhibits Gallery, another permanent exhibition (Figure 19). This exhibition focussed on the Home Front during the Second World War and follows the story of one family, the Allpresses, who lived in London during the Second World War. The exhibition is aimed at families and school groups (Figure 20). This family-friendly exhibition takes the experiences of Harry Allpress, the last surviving child of ten born to William and Alice Allpress, as a starting point to explore the lives of British families during the preparations for war, through the Blitz, to D-Day. The lighting tries to evoke the low sepia-tinted light levels of the period and includes the museum's rich collection of period decorative lighting. The exhibition features a model house of the Allpress family home, a recreation of an Anderson shelter, and focuses on life in wartime Britain through film, iconic posters paintings and objects from the IWM collections. By the time funding had been secured for the SI project, the *A Family in Wartime* exhibition, had already been signed off and was waiting to be installed. The SI project therefore had to be incorporated into the build of the exhibition at a very late stage, causing numerous issues in terms of design, timings, resource allocation, and robustness testing.

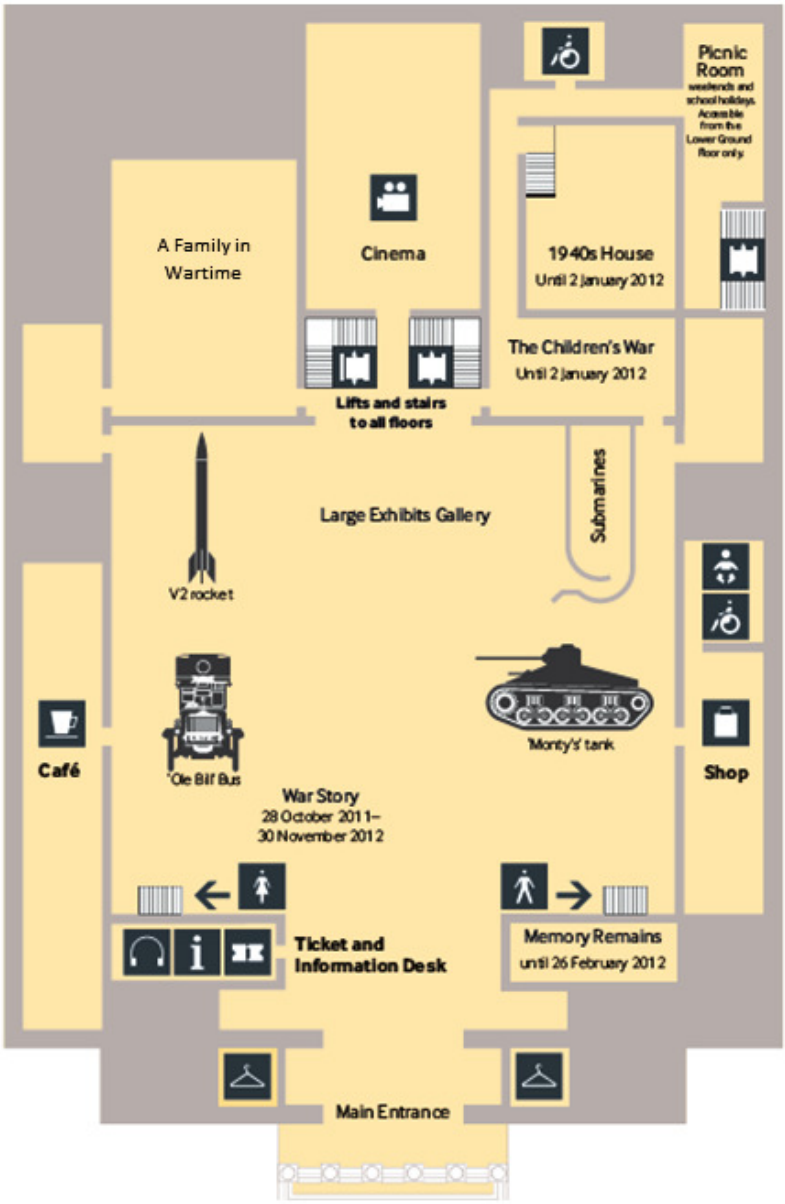



Figure 19: The Imperial War Museum London ground floor plan

The late incorporation of the Social Interpretation application into the *A Family in Wartime* exhibition brings several issues into focus for this thesis, testing our understanding of the challenges of implementing digital R&D projects in museums. We see in particular a clear example of difference in timescales. Digital innovation lifecycles and museum

exhibition lifecycles are completely different. Museum exhibitions have their own lifecycles, typically for a gallery in a national museum it can be between 2-3 years, and these may not always be consistent with a Digital R&D project, which is usually necessarily short and highly iterative. These issues will be discussed throughout the remainder of this chapter.


Figure 20: Entrance to *A Family in Wartime* exhibition

## 5.2 DESCRIPTION OF THE SOCIAL INTERPRETATION APPLICATION

The Social Interpretation project originated from a discussion with Tom Grinsted, the then Multimedia Manager at Imperial War Museums and the thesis author about how social media models could be applied to collections interpretation, offering new frameworks for engagement and 'social interpretation'. The project applied and was awarded funding by the Digital Research & Development Fund for Arts and

Culture[119], a partnership between the Arts Council England, Arts & Humanities Research Council (AHRC) and the National Endowment for Science, Technology and the Arts (Nesta), in 2011 and was developed and installed in the Imperial War Museum London and Imperial War Museum North in April and July 2012.

There were three main components to Social Interpretation; a custom bespoke application that was built in flash running on six tablets in the *A Family in Wartime* exhibition at IWM London and four touchscreen computers in the Main Exhibition Space, IWM North (see chapter 7 for the discussion of Social Interpretation in IWM North); a custom bespoke mobile application built for Apple's iOS and Android platforms entitled 'Scan and Share', and an online commenting, collecting and sharing interface entitled 'My IWM'. For the purpose of this thesis only the in-gallery Social Interpretation applications are considered (details about the mobile and online components of SI can be found in appendix 2).

The SI application installed in IWM London was part of Phase 1 of the SI project and was developed and installed for the 4th April 2012; To facilitate visitor interaction and social interpretation, six tablet kiosks were developed and installed in the *A Family in Wartime* exhibition at IWM London (for details of the second iteration installed in IWM North see Chapter 6). These are situated next to a range of objects, including an infant's anti-gas helmet, a squander bug, and an evacuee label

[119] http://www.nesta.org.uk/areas_of_work/creative_economy/digital_rnd

(Figure 21). Each of the tablet kiosks in the *A Family in Wartime* exhibition was linked to a museum object and had bespoke content written for them by the curators with support from the SI team (Table 13). As can be seen in Table 13 the curators at IWM prefer to provide authoritative, text-heavy displays to connect with IWM's core audience of 'Older Empathisers' (IWM 2012) who prefer traditional interpretation to engage with museum collections. This has been described as 'textual visiting' (CHESS Consortium 2011) where visitors primarily pass through museums reading a lot of the information panels and exhibit labels.

| **Digital Tablet Kiosks** | | | |
|---|---|---|---|
| **Object** | **Title Prompt** | **Initial Prompt** | **Extended Text** |
| **Replica Gravy Browning and Make-Up Pencil** | The height of fashion, what would you do? | How important is it for you to be fashionable during a time of shortages and cutbacks? | During the Second World War there were many shortages, including clothes and make-up. Women needed to be very inventive in finding alternatives to remain in fashion. Along with other 'Make Do and Mend' ideas, women used gravy powder to stain their legs to look as though they |

| | | | |
|---|---|---|---|
| | | | were wearing stockings.<br>Before the war, silk stockings were a vital part of every woman's wardrobe. But in 1940 the government banned the manufacture of silk stockings, and the raw materials to make them could no longer be imported.<br>Stockings made of artificial fibres – called 'nylons' – were introduced in Britain in 1942 when the first American troops arrived. However, nylons were not freely available in the shops, although some were bought and sold unofficially on the black market.<br>Women tried to make their existing supplies of stockings last as long as |

| | | | |
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| | | | possible by repairing them, but eventually they had to look for substitutes.<br>Cosmetic companies produced lotions and creams which could be applied to the legs, colouring the skin to make it look as though you were wearing stockings. But this leg make-up was difficult to find outside London and was too expensive for most women. Cheaper versions were introduced but the colour sometimes stained clothes, washed off in the rain or made legs look blotchy. Many women made their own versions of leg make-up using gravy powder, cocoa or coffee. Women would also drew lines up the backs of their |

| | | | |
|---|---|---|---|
| | | | legs from the heels to imitate the seams of real stockings. |
| **Squander Bug Air Rifle Target, EPH 4611** | Is it a crime to be wasteful in a time of war? | Propaganda is designed to make you behave in a certain way. Do you know when you are being manipulated? | This strange-looking creature was designed to make you think twice and feel guilty about spending money on things you did not really need.<br>The Squander Bug was a wartime cartoon character intended to discourage waste and over-spending. A hairy, evil-looking character, covered in swastikas and with a forked tail and a certain facial similarity to Hitler, the Squander Bug was created by illustrator Phillip Boydell, who worked for the National Savings Committee.<br>From 1943 the Squander |

| | | | |
|---|---|---|---|
| | | | Bug featured heavily in the National Savings Committee's poster campaigns. He was often shown whispering into shoppers' ears, trying to persuade them to spend their money on luxuries and frivolous purchases, rather than saving their money or investing in National Savings Certificates.<br>The government wanted people to save their money rather than spend it on consumer goods, as this would help to keep inflation levels down. Higher inflation would make all of the materials which the country had to buy to fight the war (suggest adding an example here as it's not too clear, so 'such as ...') much |

| | | | |
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| | | | more expensive.<br>By 1943 there were nearly 300,000 savings groups in Britain and individuals were saving approximately a quarter of their disposable incomes. However, the popularity of saving was not only due to government campaigns. Rationing and restrictions on the production of luxury goods meant that there were far less things in the shops for people to buy! |
| **Evacuee Label made out to Doreen Bowring, EPH 3764** | Send them away? | Would you part with your children during wartime? | Are there any circumstances that would lead you to part with your children? At the beginning of the Second World War the British government was worried that air raids would start immediately over the cities causing many |

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| | | | casualties – including children. Family life was seriously disrupted and issues regarding the safety of children became particularly important, leading to a mass evacuation of children in September 1939, which required a huge amount of organisation and planning.<br>Evacuees were sent in groups from their schools to their nearest train station or departure point and directed to the next free train or bus. To make sure that children did not get lost or separated from their group, every evacuee had to wear a label which had their name, address and school written on it. Every child also had to carry their own |

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| | | | gas mask and luggage.<br>When they arrived at their destination, evacuees were gathered together in a large building such as a church hall and were allocated to local families who had volunteered to take in children and give them a temporary home. Where possible, brothers and sisters were sent to the same family, but sometimes they were separated. This could be very upsetting, especially for very young children and those who had never been away from home before.<br>Each evacuee was given a blank postcard that they could fill in with their new address. These were sent their parents so that they |

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| | | | would know that their children had arrived safely. |
| **Infant's Anti-Gas Helmet, EQU 3716** | What is your greatest fear should war be declared? | What is your immediate reaction to learning that babies were put into these objects? | In 1938, as Britain began to prepare for war, gas masks were distributed to protect the population in case of a poison gas attack. There was a standard adult gas mask and a specially designed 'Mickey Mouse' gas mask for children aged between two to five. But there was nothing to protect vulnerable babies and very young children under two years old.<br>The following year, a device for babies called a 'gas helmet' was developed and distributed. The baby was laid on its back and strapped into the helmet, which consisted of a metal-framed rubber hood |

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| | | | covering the baby's head, chest and arms. The hood was tied at the baby's waist to keep it secure. Understandably, most babies cried when they were shut inside the helmet. The helmets were large and heavy which made it impractical for mothers to carry them around when they went out. Air had to be pumped constantly into the helmets manually for them to work properly. But mothers often found that it could be difficult to operate the pump whilst also putting on their own masks, or helping other children with theirs. |
| **People celebrating VE Day** | A time to celebrate? | Photographs like this have become well- | Photographs often capture momentous events. These are typical photographs |

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| **pass through the Strand, London, on a truck, 8 May 1945 IWM HU 41808** | | known as part of the story of the Second World War. Do they give a complete picture of how people felt? | recording the celebrations that took place on 8 May 1945 on Victory in Europe (VE) Day. The war however was not over for everyone.<br>At 3pm on Tuesday 8th May, Winston Churchill addressed the nation and announced that the war with Germany was over.<br>The day was declared a national holiday and became known as Victory in Europe (VE) Day. Street parties were held nationwide with fancy dress parades and tea parties for children and music for the adults; especially popular were patriotic songs such as 'There'll always be an England' and 'Land of Hope and Glory'. In many places the celebrations continued |

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| | | | in the evening with dancing, bonfires and fireworks – the latter were a particular treat after almost six years of strict blackout restrictions.<br>Many people celebrated close to home with their families, friends and local communities, but large crowds also flocked to central London, particularly to see the Royal Family appear on the balcony of Buckingham Palace.<br>However, the war was not over for everyone. Many families still had loved ones serving in the Far East, where the war against Japan did not end until 14th August. The celebrations on Victory over Japan (VJ) Day were more muted than VE |

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| | | | Day – the war in Europe had felt that much closer to people in Britain. |
| ***The Queue at the Fish-shop,* 1944, by Evelyn Dunbar, oil on canvas IWM ART LD 3987** | Is patience is a virtue? | What do you think this painting tells us about life during wartime? | Artists were commissioned to paint pictures of everyday life on the home front during the Second World War. But do their paintings give us a realistic insight into the past?<br>*The Queue at the Fish-shop* was painted by the artist Evelyn Dunbar in 1944. It conjures up a typical view of shopping during the war, when queuing was a daily occurrence.<br>By 1944, long queues like the one in the painting would have been a familiar sight in high streets across Britain. Food rationing had been introduced in 1940 to manage food supplies and |

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| | | | to ensure that everyone got a fair share of essentials such as sugar, fats, meat, cheese, tea and bacon. But foods that were not rationed, such as fish, were in great demand when they did appear in shops, and sold out very quickly. As the painting shows, it was usually women who did most of the shopping – and queuing.<br>Evelyn Dunbar was one of only a relatively small number of women who worked as official war artists during the Second World War. Most of her paintings show women carrying out war work, especially on the land, or adjusting to the changes that the war had brought to |

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| | | | their everyday lives.<br>The artist and her own family also appear in this wartime scene. Evelyn Dunbar is looking out at us from the front of the painting, her husband is the man on the bicycle, and the figure on the right hurrying towards the queue is her sister. |

Table 13: Textual content for the 6 SI tablet kiosks in the *A Family in Wartime* exhibition.


Figure 21: Example object with SI tablet kiosk in the *A Family in Wartime* exhibition; Squander bug air rifle target. Image taken by Jane Audas and used with permission

Each provocative question is framed within two screen states. The first iteration of the SI tablet included two screen states; one depicting the 'museum voice' (Figure 22) and one depicting 'the visitor voice' (Figure 23). The 'museum voice' acted as a digital label providing curatorial information and imagery of the object. The visitor encounters a screen where an image of the object and its name is presented. Above and underneath the image a provocative statement or question is posed which is designed to generate visitor comments. The right hand side of the screen highlights two visitors comments as examples and provides

a 'touch to comment' interaction point which takes the visitor to the commenting or 'visitor voice' screen (Figure 24). The 'visitor voice' acted as a space to enter a comment and to present visitor comments from the most recent to the oldest. In order to enter a comment a visitor would have to enter their name or an alias (this is the only demographic data from visitors that was collected by the Social Interpretation project)[120]. The visitor could swipe between the two states. There were also some additional interaction elements in the 'visitor voice' screen; the ability to like or dislike a comment, the ability to reply to a previous comment, and most importantly the ability to remove or report a comment. This remove button provided a function for any visitor who expresses concern or dissatisfaction with any of the visitor generated comments to raise this as potentially inappropriate material to the museum which not only removes the comment from view, but also raised this with a member of staff who could check the query. Visitors' could respond to current questions posed by the museum, contribute to discussions, and leave comments about individual exhibits. Visitors' contributions were synchronised with the IWM Collections Information Integration Middleware (CIIM) and can be accessed on the collections search pages of the IWM website[121] to allow

[120] From this name data it may be possible to estimate the gender and age of visitors A full discussion of the visitor name data is out of the scope of this thesis but for an example of how fist names can provide data on age and gender, we can refer to Gallagher and Chen's (2008) work about estimating age, gender, and identity using first name's to aid the facial recognition process. They highlight that first names can convey a lot of information about year of birth and of gender.

[121] http://www.iwm.org.uk/collections/search

visitors to contribute to the continuing discussion away from a museum setting.


Figure 22: Screen shot of the museum voice screen


Figure 23: Screen shot of the visitor voice screen


Figure 24: Visitor inputting a comment into one of the SI kiosks

One of the key research questions the SI project aimed to explore was the effectiveness of, and the risks and challenges involved in, using social moderation as a means of dealing with visitor generated content in the physical (and digital) museum space. Visitor contributions made through the SI kiosks, app and website were not reviewed by IWM staff before going live on the gallery floor or website (although staff were able to review and post moderate visitor contributions once they had been made). Visitor contributions would be uploaded immediately in real time with the caveat that a profanity filter was applied to the message before being sent to the server. An automated editable centrally managed profanity filter was developed by the SI team, which automatically stopped comments containing banned words and phrases from being submitted. This filter contained an editable library of profanities which included whole words as well as disguised words that

used special characters such as '$' to replace 'S', '1' to replace 'I' and '8' to replace 'ate'. In addition to the profanity filter, as discussed earlier, a social moderation layer was added to the SI kiosk interface. Of note, is the remove button which provided a remove and review by museum staff function.

## 5.3 DATA COLLECTION AND ANALYSIS METHODS

Data from the six Social Interpretation tablets was collected by archiving contributions from the 4th April 2012 to 1st January 2013. Each individual visitor contribution was simultaneously uploaded to the IWM CIIM master database, followed by the IWM website pulling the data about each current question from the master database and integrates these comments within IWM Collection Search online. These comments were then aggregated together based on the location, device and object in the museum. A custom module was built for the IWM CIIM for moderation purposes by Knowledge Integration to collect the data from the public API and produce the output as a CSV (comma separated values) file which was then imported into both Excel and Nvivo[122] statistical analysis packages for further analysis. This resulted in a corpus of 18,115 visitor contributions, with a total of 76,697 words containing 11,602 unique words, providing a rich dataset for the analysis of visitor engagement. In a 9 month period SI in IWM London

[122] The same software was used for all three case studies. See footnote 100 for details on Nvivo. http://www.qsrinternational.com/products_nvivo.aspx

recorded over 6 times as many visitor contributions as QRator in the Grant Museum.[123]

Visitor contributions were categorized qualitatively using open coded content analysis where each comment was read and categorized, for details of this method, see section 3.4 Additionally for the purpose of this study, various quantitative measures were used such as analysing the frequency of comments according to date and time, comparing comment rate between the six SI tablets and suitable text analysis tools were used to interrogate the corpus, including sentiment analysis[124].

In addition to the data collection and analysis of the visitor generated content a series of observations were undertaken at IWM London. The observation study consists of observing, coding and measuring visitor times and interpreting visitor behaviours during the observation period. Observations at Imperial War Museum London were undertaken during the 1st-15th December 2011. From this process, 31 visitor behaviour maps were produced. Video based observations were not undertaken at IWM London due to restrictions on filming in the gallery space.

[123] IWM London receives roughly 80000 visitors a month (DCMS 2014), whereas the Grant Museum receives roughly 1040 visitors a month (Ashby 2012).
[124] Details of methods of analysis can be found in chapter 3.

## 5.4 ANALYSIS OF DIGITAL VISITOR GENERATED CONTENT

The largest proportion of visitor contributions in the corpus fell into one main category (Figure 25); noise (42%). The noise category, for the purpose of this study, reflects visitor contributions which are seemingly spam and trolling comments. MacDonald (2005) describes these contributions as 'graffiti' (2005, p.127) with many of the comments appearing to have little to do with the exhibition or theme. For example; "I iz in ur xhibition trolling ur comments", "lol" and "hi" as well as random text key entry such as "Bbychvgfgdc". Whilst a certain level of meaningless interaction is always expected in applications harnessing user generated content; due to the nature of open participation which increases the incidence of 'spamming' and 'trolling' by misanthropic users. The actual volume of spamming, trolling, and unhelpful commentary is higher than expected. This was almost certainly caused primarily by the number of children and school groups who interacted with the kiosks. Certainly, the volume of inane and banal comments was one of the more negative features of the SI technology, which we believe may have caused many visitors to avoid reading further comments or to leave their own. Jane Audas, the Social Interpretation project manager believes that "due to the scale of the noise comments any 'on topic' comments became buried and visitors probably did not notice them" (Audas 2013 pers. comm. 10th December).

The high percentage of noise contributions highlight one of the underlying issues for the Social Interpretation project; the risk posed to the museum as a result of their 'hands off' approach to moderation of visitors contributions on the tablets, and the risks visitors face in terms of contributing their experiences upon objects. As Aula (2010) states: "In social media services, users mostly generate unverified information – both true and false – and put forth ideas about organizations that can greatly differ from what organisations share with the public – that is, an organization's own idea of what it wants to be" (Aula 2010, p.45). Concerns were raised by the IWM exhibition team and head of Digital Media that a comment made by a visitor could cause harm or damage to both the institution and the visitor in question. This damage could manifest, for example via reputational and legal impacts upon IWM and or the visitor in question. The noise category represented a significant risk for IWM. From the outset of the project a major concern of the project team was that the reputation of IWM could be harmed if the engagement of visitors was not managed appropriately. Therefore much effort was invested in interrogating the risks involved and this resulted in a model of moderation practice. Additional thought was also given to the selection of objects and the prompt questions associated with these. Imperial War Museums as an organisation is, by one definition, a huge repository of objects that, when presented to the public for comment, could lead to dialogue visitors may find distressing and/or deeply objectionable. However, of course the riskiness of the objects in the IWM collection varies considerably. Therefore, objects

were sought that were conceived of as holding the capacity to act as a prompt for discussion, yet minimise the chances of generating deeply problematic dialogues and unwanted headlines in the media. Based on the analysis of the comment data, it appears that a good balance has been struck in this respect. During the project there were no incidents involving problematic dialogues, with very few as what might be seen as 'high risk' visitor responses being made – the usage of pro-Nazi propaganda or racial slurs for example. Therefore it appears that this potential problem has not become one in reality. Regardless of the lack of 'high risk' responses within the noise category, 48% of contributions being deemed as nonsense is still a significant factor in terms of visitor experience. Social moderation as a tool does appear to work with 6167 comments being actively reported by visitors to the gallery floor. 86.8% of these socially moderated visitor contributions (5356 comments) were subsequently moderated as problematic by museum staff with safety notes ranging from 'off topic', 'nonsense', 'spam' 'foreign language' and 'inappropriate content' and were removed from public view. 9.4% of the socially moderated comments reported by visitors were reinstated and returned to the visitor comment screen on the SI kiosks by museum staff and marked as safe. This, social moderation however, was not utilised enough to remove all of the visitor contributions deemed as noise. Nevertheless it is clear from the number of reported comments that a proportion of visitors were willing to engage in processes of moderation and this is a very interesting finding for the SI project and for the use of digital visitor generated

content in museum spaces.

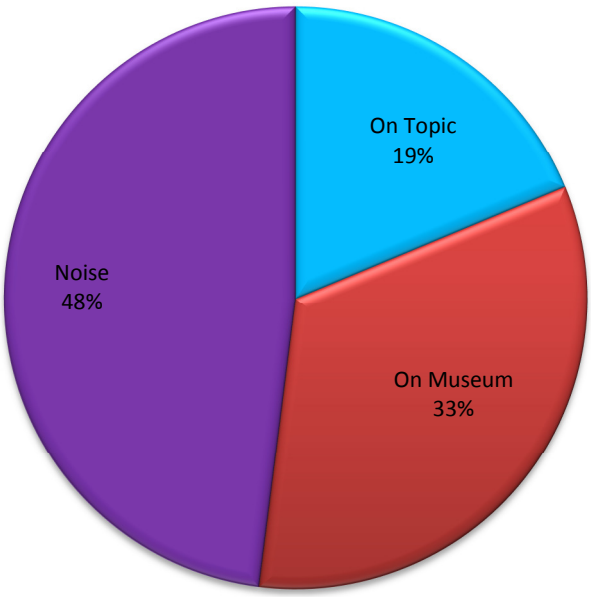



Figure 25: Percentage of visitor contribution by category. The majority of the comments in the corpus fell into 'noise' comments

The types of comments in the 'about the museum' category (33%) varied considerably; ranging from long experiential comments, "I think this exabition is very well donee and captures what the family would have been through. Well done.[*sic*]" to visitors focusing on particular elements and objects in the exhibition and the rest of the museum as a whole, "The shelter is scary" and "I really enjoyed the Blitz experience, very realistic." and one word statements, "cool", "amazing" and "good". A large proportion of the one word visitor contributions were deemed 'nonsense' by the museum. However, there are a range of negative comments including 'scary' and 'sad'. As discussed in the previous

chapter, it might be easy to dismiss these style of comments as irrelevant and facile, but it is clearly a significant form of visitor contribution. It is questionable whether one word answers can provide an insight into levels of visitor engagement or the impact of digital visitor generated content on visitor experience. Nevertheless, the high percentage of opinion terms does suggest that the opportunity provided by SI for visitors to give their opinion has had a positive impact on their museum experience, because it gives them an opportunity to voice their own views. The 'about the museum' category demonstrates that some visitors were engaged with the museums as a whole and were compelled to leave a responses about their experience. This use of digital visitor generated content potentially provides a direct insight into visitor experience rather than trying to ascertain level of engagement form 'on topic' responses to the museum prompt questions or direct responses 'about the museum objects themselves. The 'about the museum' visitor responses raise the issue of whether digital technology used in this way promotes of an opportunity for visitors to make meaning from their whole experience, rather than engage with the exhibit specific content and interpret the exhibitions themselves. This introduces an interesting question about the nature of value and success of visitor generated content and engagement. It may be of more value to visitors to generate content about their overall museum experience. Whereas it may be of more value to the museum for visitor generated content to remain 'on topic'. Frameworks for success with regards to digital visitor generated content should take

into consideration what value and success mean for visitors and for the museum.

When comparing the individual SI prompt questions, it can be seen that certain questions gained more visitor contributions than others (Figure 26). The evacuee label received the highest number of contributions (3636) followed by the Make Do and Mend gravy packet (3232). The Squander bug received the least number of visitor contributions (2507).

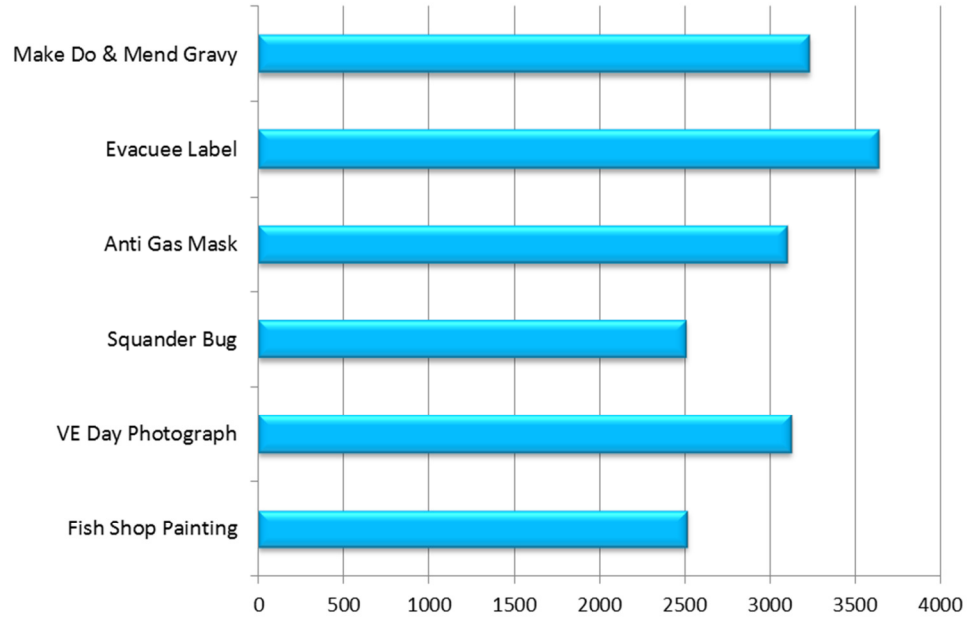



Figure 26: Total number of visitor contributions for each IWM London highlight object

When further focusing on the individual highlight objects and SI prompt questions it is possible to see that some prompt questions produce higher levels of 'on topic' visitor contributions then others (Figure 27). The Anti-Gas Mask received the most contributions by visitors which focused on the Social Interpretation prompt question (940 contributions), followed by the Evacuee Label (719). This is not

surprising as both the gas mask and evacuee label are very emotive objects and are more likely to provoke an emotional response which visitors can directly associate with their own previous experiences and understanding of the exhibition. The VE Day photograph received the least number of 'on topic' contributions (247). This is likely to be due to the placement of the touchscreen. The VE Day photograph tablet was not directly linked to the IWM Collection Photograph. The ergonomics of the tablet mount may have also played a part in the lack of 'on topic' comments as the tablet was installed in the exhibition at an inaccessible height and proved incredibly difficult to interact with due to its placement flat against a wall. All the SI highlight objects received high amounts of noise contributions. In one instance (VE Day Photograph) the noise category was over six times higher than the 'on topic' contributions.

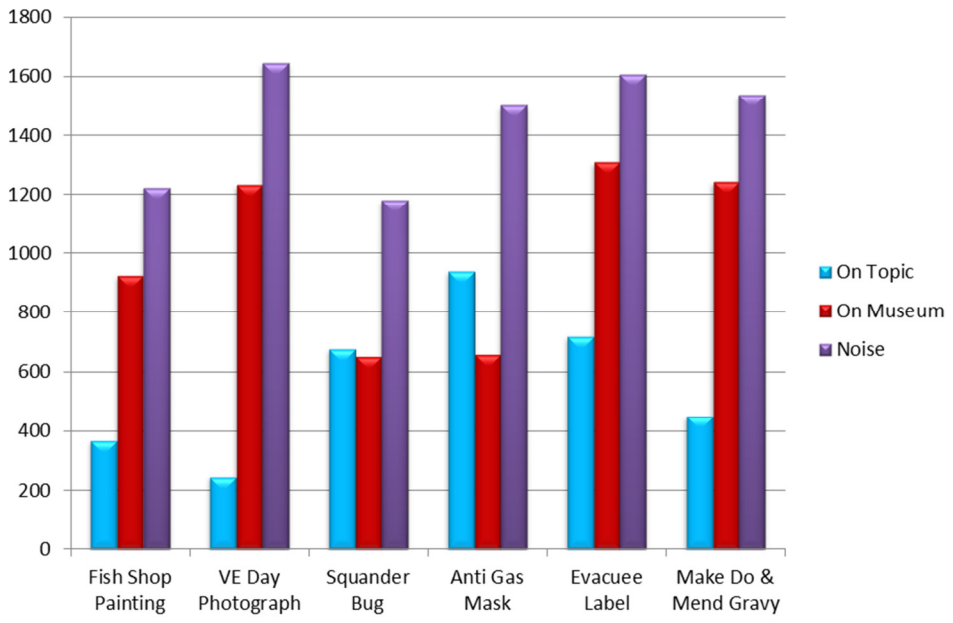



Figure 27: Category breakdowns from each of the six Social Interpretation tablet kiosks

Analysing the frequency of comments according to date and time (Figure 28), comparing comment rate between the individual prompt questions also produces some interesting results (Figure 30).

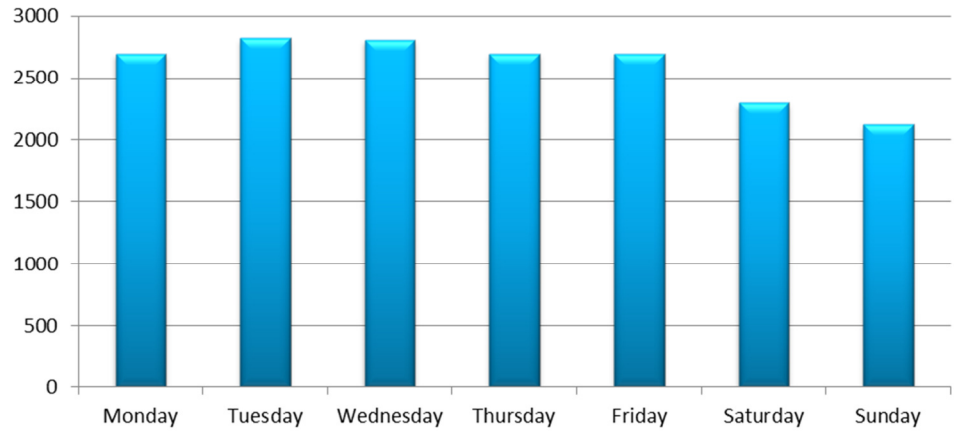



Figure 28: Daily frequency of all SI IWM London visitor contributions

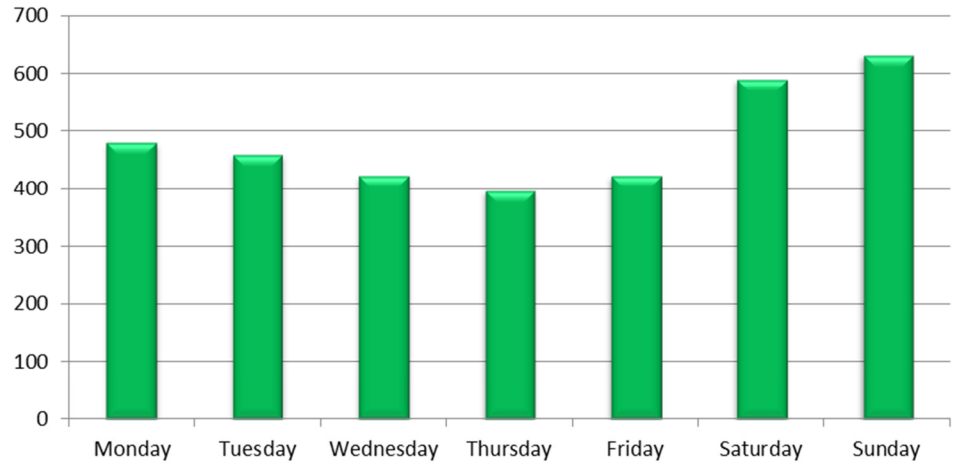



Figure 29: Daily frequency of 'on topic' SI IWM London visitor contributions

Firstly it is possible to see that there is a reasonable spread of visitor contributions throughout Monday to Friday (Figure 28) with a decrease

in visitor contributions over the weekend. Conversely when looking at the daily frequency of 'on topic' contributions (Figure 29), it is possible to see an increase in the number of on topic contributions at the weekend. When comparing the frequency of the 'on topic' category to the 'noise' category (Figure 30) it appears that during the week that the ratio between on topic, museum and noise categories remains relatively steady throughout the week. There is however a notable decrease in noise contributions during the weekend and a substantial increase in on topic contributions. The 'about the museum' contributions, however, appear to be unaffected by the day of the week. The different between on topic and noise categories during the week suggesting that less visitors contribute engaged and reflective responses, proportionately in busy periods, reasons for this could be due to the museum environment not being conducive to contributing during the week likely to be due to the number of school groups in the museum space, in comparison when there is more time and space to contribute during quieter periods at the weekend.[125]

[125] Unfortunately it has not been possible to get accurate school group visitor numbers for IWM London for the data collection period, but we have data that indicates that IWM London had total number 145,000 educational visits for 2012-2013 from September 2012 to July 2013 (IWM 2013) which suggests on average 1318 school visits a month.

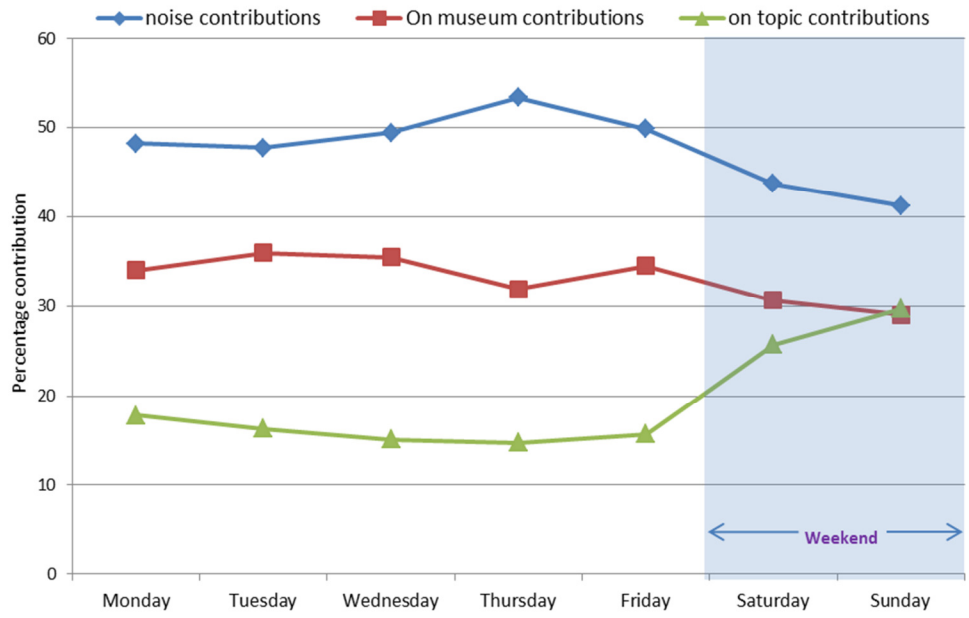



Figure 30: Daily frequency of SI IWM London visitor contributions by category

In terms of actual visitor contribution practice, Figure 31 displays commenting levels in total for the visitor contributions from 4th April 2012 to 1st January 2013 which can then be compared to the category group of 'on topic' whilst all the SI tablets at IWM London were in operation (Figure 32). From this it can be seen that in the first five months of installation the amount of daily visitor contributions is relatively low with the highest number of visitor contributions being on the 11th May with 56 contributions. Then from the 21st August the number of visitor contributions goes up significantly. At first this jump in contributions does seem to correlate with the start of the new school year, and school group visits to IWM London[126]. There are incremental increases throughout September and October 2012, reaching a peak at

[126] IWM London had a total of 145,000 educational visits for 2012-2013 from September 2012 to July 2013 (IWM 2013).

297 contributions on the 30th October 2012 (Tuesday). This then begins to decrease in November and December. When looking at the incidence of 'on topic' visitor contributions (Figure 32) the frequency of responses follows a similar trend with the first five months being relatively low. Followed by spikes on 21st September 2012, with 55 on topic contributions, 14th October with 52 contributions and reaching a high spike of 95 responses on the 30th October 2012.

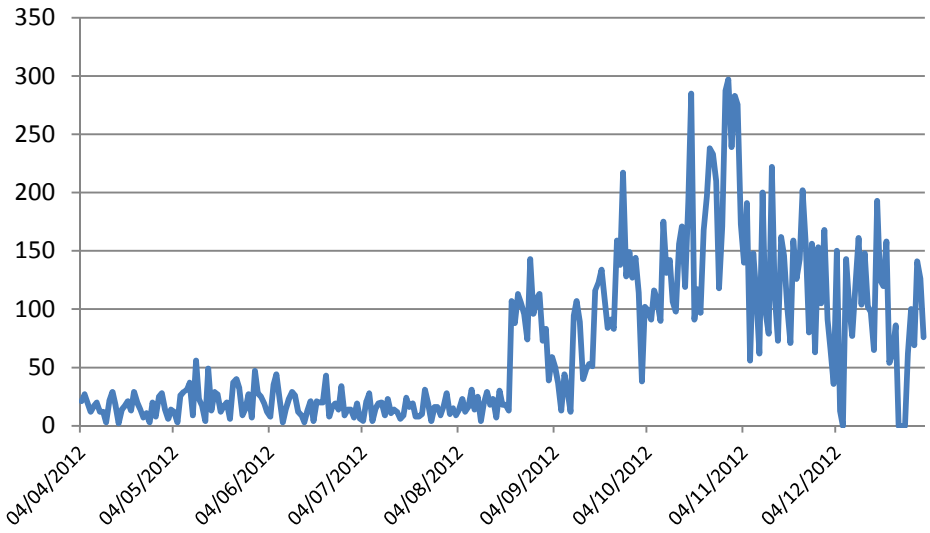



Figure 31: Total number of visitor contributions to SI IWM London by date

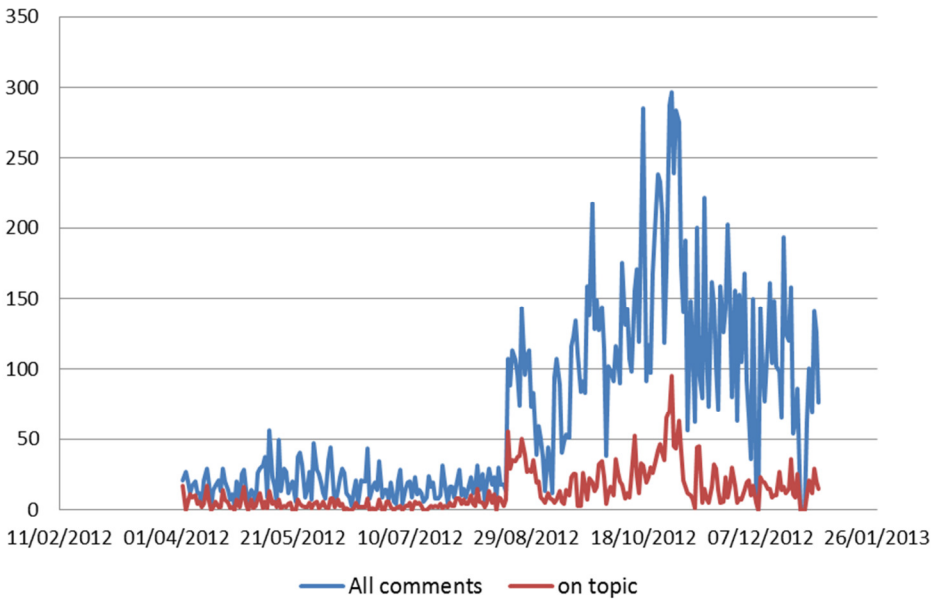



Figure 32: Comparative analysis of 'on topic' contributions against the total number of contributions

Further examination of the raw data, however, indicates that there is a significant step change in total visitor contributions on Tuesday the 21st August 2012. This does not correlate either with normal weekly peak visitor contributions (Figure 28) or with a typical school start of term, which is normally September. To investigate further, archived project documentation and reports[127] were explored in depth, revealing that a SI software update had been pushed across the Family in Wartime gallery in London[128]. The update contained a series of changes aimed to resolve a number of issues with the software including connection problems and comments not being saved to the SI

[127] The SI project utilised Basecamp for project management and documentation. https://basecamp.com/ Basecamp is one of the leading web-based project management and collaboration tools.

[128] Ben Tandy, freelance developer on the SI project notes on the 21st August 2012 that a Social Interpretation Update - v1.1 was pushed across the Family in Wartime gallery in London. The changelog included a fix for an issue which occurred when the kiosks started, if it could not retrieve comments due to network issues, further attempts may not occur.

database. The issue with comments not being saved appears to have affected all kiosks simultaneously: the problem meant that each morning when the kiosks started if they could not retrieve comments due to network issues, further attempts may not have occurred properly, which explains the lack of comment data for the first 5 months of the data collection period. This undoubtedly has implications on the data analysis and results. This also highlights one of the issues of using this method of data collection to understand visitor experience; the reliability of the digital software to record and archive absolute data accurately.

It is considered that all kiosks were equally affected, on the basis that they comprised identical hardware and software (See appendix 2 for technical specifications). Therefore, analyses of contribution data made earlier in this chapter can still be considered as representative and useful for the purpose of this thesis (Figures 25-30). In other words, each kiosk can be assumed to have lost the same proportion of visitor contributions as each other. For example, take Figure 26; the pattern of visitor contributions would be the same (The evacuee label would still have received the highest number of contributions and the Squander bug received the least number of visitor contributions), but the absolute values may be higher. The temporal profiles of the data (i.e. timelines of visitor contributions Figure 31 and 32) may not show an accurate representation of visitor contributions before the 21st August 2012, relative to contributions after this date. This is on the basis that only a

proportion of contributions were archived before the 21st August, giving assumed relative, but not absolute frequency data.

This issue with the SI software highlights a theme with is central to the research question posed in this thesis, namely, what are the challenges of implementing digital innovation in a museum environment. Due to the SI project's very late incorporation into the build of the *A Family in Wartime* exhibition there was little time for adequate robustness testing. This clearly highlights that the pace of technology projects is misaligned with the fiscal, creation, development and installation cycles of museums. The challenge of incorporating the SI kiosks into the exhibition at a very late stage (causing incredibly tight development and installation schedules for the SI kiosks to be installed in the gallery in time for an April opening) meant that the project team then had to carry out iterative technical development in a live environment. If time had been available prior to the exhibition opening essential software tests could have been undertaken and this software issue could have been resolved before it was open to visitors. This incident highlights that it is important that realistic time-scales be adopted for all project partners, as developing digital applications from the ground up can take a significant amount of time and not allowing for this can lead to delays which then affect all other aspects of digital innovation. The nature of innovation means that things can change quite quickly and often. As a result of such changes, there can be impacts upon such things as development, installation, evaluation, and analysis. Along with this

challenge came the pressures of the museum exhibition team and visitor services staff expectations that the kiosks would always be fully functioning. Carolyn Royston, Head of Digital Media at IWM stated;

> From an organisational point of view, one of the things that is really fascinating is to see what the impact of this project has had on our front of house, our visitor service teams in terms of resources, expectations and any training that is required. The key lesson learned from the SI project is that we need to better plan and integrate projects involving visitor-generated content into a wider programme. These projects extend beyond the Digital Media department and require buy-in, resource and time from other areas of the public programme such as marketing, visitor services, curators/historians, exhibitions etc (Royston 2013 pers. comm. 15th December).

For example, another issue with the SI kiosks arose when it was discovered that the kiosks were not restarting overnight. The *A Family in Wartime* exhibition visitor services staff were not restarting the kiosks on a daily basis (Tandy 2012) meaning that if a problem with the software did occur, it would not be resolved until a full restart was completed. This was due to insufficient training and support for the visitor services team that the kiosks would need to be restarted correctly on a daily basis. This brings into focus another challenge to implementing digital innovation projects in museums, that of and communication and advocacy with the whole institution.

Jane Audas believes that SI in this instance is not a fair case study for digital innovation;

> We were really close to getting an answer to how digital innovation project can extend visitor engagement, but due to the institutional difficulties and lack of support we didn't really get a chance. The concept and reality were misaligned. Trying to work iteratively and in an agile way in an institution like IWM, which is not an agile institution, caused numerous challenges around development, we took on too much and mistakes were made. It is not a fair user case (Audas 2013 pers. comm. 10th December).

However, because of the learnings from the SI project a number of transformations are being made at IWM to enable digital innovation to become more imbedded into the institution:

> We introduced a Digital Transformation Strategy in early 2013 that details the key areas of focus that we need to action in order to transform into a digital organisation. Digital transformation is happening in a number of different ways – through delivery of key digital transformation projects, by raising the digital capability of staff and promoting digital leadership, and by introducing transformative digital processes such as agile project management methodologies across the organisation enabling us to prototype rapidly, gain feedback and iterate. We have also introduced new approaches to content commissioning

and production, developed new audience types for our digital channels, and introduced new industry standard roles for digital to widen the skills and knowledge based within the Digital Media department beyond the experience of the museum sector. New posts with a digital focus are appearing across the museum and digital competencies have been introduced as part of a wider competency framework – to raise standards and expectations around digital skills, ensure digital is integrated fully into planning, delivery and sustainability of our services and to be explicit that as an organisation we need to embed digital instinctively in our work (Royston 2013 pers. comm. 15th December).

### 5.4.1 TEXT ANALYSIS OF DATA

Text analysis tools were used to interrogate the corpus of visitor contributions. MacDonald (2005) suggests that the analysis of visitor comments is in many respects similar to other kinds of texts, and is therefore, in principle open to many of the analytical techniques employed for textual analysis in other contexts. It was assumed that frequent terms from the SI visitor contributions would reflect the topics and themes being discussed in the physical museum space. The IWM London SI data was run through a commonly used text analysis tool

Voyant[129], to highlight the commonly used words in the visitor contributions, and to enable a Sentiment Analysis to take place. The figure below highlights (Table 14) the most commonly used words in the IWM London visitor contributions corpus from the 4th April 2012 to the 1st January 2013. Words are shown in exact frequencies, excluding words like 'the' and 'a' (using the Taporware[130] English Stop Words List). 'Cool' is by far the most commonly used word, with a frequency of 1085. Other key words demonstrate that visitors appear to be positively engaged in the museum experience. The remaining most frequent words in the corpus seem to highlight positive visitor contributions: like (836), good (727), war (682), love (631), museum (320), really (459), great (443) and amazing (367). Conversely if the nature of the repeated contributions are considered, it does reinforce the museum perspective that the majority of existing comments on the screens were 'nonsense' or banal, potentially providing little incentive to other visitors to read them or spend time formulating individual views relating to the prompt question. Although it might be easy to dismiss these styles of comments as impertinent and flippant, with little meaning for levels of visitor engagement, particularly out of context when only focusing on the frequencies of the words, it nevertheless is a significant form of visitor contribution. The words with the highest frequencies (excluding 'hi' with a count of 792); cool (1085 count), like (836 count) and good (727) are all positive sentiments expressed by

[129] http://voyeurtools.org
[130] TAPoR is a Text Analysis Portal for Research to a range of tools used in sophisticated text analysis and retrieval. http://www.tapor.ca/ The TAPoRware stop word list is a list of words which are filtered out before processing textual data.

visitors, highlighting the positive experience they are having in response to the museum.

| Word | Count | Word | Count | Word | Count |
|---|---|---|---|---|---|
| cool | 1,085 | people | 246 | ã | 119 |
| like | 836 | awesome | 235 | dont | 119 |
| hi | 792 | wow | 231 | hey | 119 |
| good | 727 | sad | 207 | baby | 113 |
| war | 682 | im | 204 | intresting | 112 |
| love | 631 | fun | 202 | feel | 111 |
| museum | 520 | nice | 187 | horrible | 108 |
| really | 459 | best | 164 | bad | 103 |
| great | 443 | looks | 161 | hard | 102 |
| amazing | 367 | time | 161 | food | 100 |
| think | 350 | epic | 156 | blitz | 99 |
| interesting | 336 | â | 148 | gravy | 98 |
| place | 336 | awsome | 143 | know | 98 |
| yes | 334 | hate | 141 | away | 97 |
| hello | 321 | world | 140 | want | 96 |
| scary | 285 | children | 129 | hitler | 93 |
| lol | 249 | gas | 125 | | |

Table 14: Table highlighting the most popular words. Words and phrases are spelled and capitalised exactly as they appeared in the IWM London SI corpus.

When the IWM London corpus is spilt into the three categories; 'on topic', 'about the museum' and 'noise', it is possible to compare the frequencies of words. The on topic visitor contribution corpus contains high frequencies of terms directly relating to the prompt questions and objects; 'yes', 'war', 'think', 'gas' and 'children'. Including some strong emotional terms like; 'sad', 'scary' and 'like'. This suggests a high level of deep thinking and engagement with the prompt questions and objects on display. The 'about the museum' visitor contribution corpus contains high frequencies of positive adjective; 'cool', 'good', 'like', 'great', 'love', and 'amazing'. The high word frequency words in the noise category contain banal terms like; 'hi', 'hello' and 'lol'. The length of comment may also be used as an indicator of engagement; if we assume that those who are interested in an issue or topic may wish to write at greater length. Indeed the average length of comment increased between categories. The 'noise' category had an average of 2.8 words, comments 'about the museum' had 4.7 words and visitor contributions 'on topic' had an average of 6.8 words. This is pleasing, since it suggests that visitors were inspired by the questions to engage with topics in a relatively complex fashion. Additionally when compared to the SentiStrength results, which classifies for positive and negative sentiment on a scale of 1 (no sentiment) to 5 (very strong positive/negative sentiment), highlights that the visitor contributions 'about the museum' were in average more positive in sentiment (2.19 positive; 1.38 negative) whereas the comments on topic had a more weighted negative response (1 positive; 2.62 negative). This suggests

more engaged texts often contain a mix of positive and negative sentiment, in contrast to less engagement which is more likely to produce a single sentiment result.

## 5.5 ANALYSIS OF OBSERVATIONS

The observation sessions at IWM London quickly determined visitors' patterns of label reading in the museum space. The majority of visitors observed showed moderate engagement with the written interpretation, choosing to read/study object labels before engaging with the objects themselves. This suggests that the majority of visitors have a preference for ideas, requiring information and perspective from the museum before considering objects. Tracking visitor movements and behaviour within the atrium space (the atrium space was used as the *Family in Wartime* gallery was still under construction during the observation period) highlighted certain exhibits or areas which held visitor attention and encouraged prolonged engagement.

The average visitor journey highlights that the spatial arrangement of the atrium space discourages access to the smaller objects in the centre of the space as well as objects in the corners under the mezzanine level. The average visitor journey around the Large Exhibit Gallery is as follows (Figure 33):

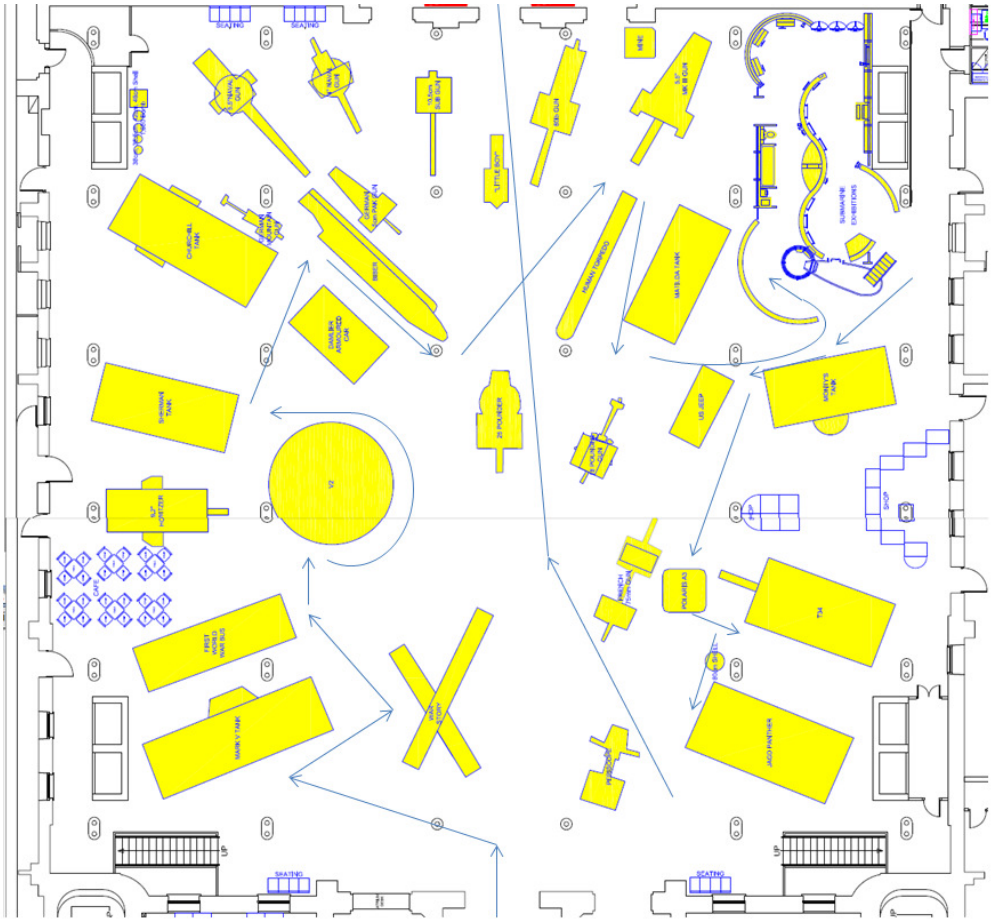


Figure 33: Diagram of the average visitor journey in the atrium space

The objects/areas providing the most prolonged engagement in IWM London:

- Italian Human Torpedo
- War Story
- Tank Destroyer
- British First World War Mark V Tank

Associated behaviours included looks or studies with intense interest at the label, extensive viewing of individual objects followed by discussion and social interaction with visitor group. This appears to mirror the higher level of 'on topic' visitor contributions found against the larger highlight objects in IWM North discussed in Chapter 6.

On average, visitors spent 15.6 minutes in the atrium space (Figure 34 and Table 15). A number of studies have been conducted examining the amount of time visitors spend in exhibitions. For example, Serrell (1997) seminal publication investigated the amount of time visitors spent across 108 exhibitions, including history museums, art museums science centres, zoos and aquaria. From this data, Serrell suggests that visitors tend to spend, on average, approximately 13 minutes in an exhibition, regardless of its size or topic (Serrell 1997). In this way, the large exhibits gallery in the atrium space is well above average in terms of time spent.

| **date** | **Visitor observation number** | **entry time** | **exit time** | **dwell time in gallery (minutes)** |
|---|---|---|---|---|
| 1st December 2011 | 1 | 10.07 | 10.14 | 7 |
| 1st December 2011 | 2 | 10.2 | 10.5 | 30 |
| 1st December 2011 | 3 | 10.59 | 11.13 | 14 |
| 1st December 2011 | 4 | 11.19 | 11.27 | 8 |
| 1st December 2011 | 5 | 11.32 | 11.38 | 6 |

| | | | | |
|---|---|---|---|---|
| 1st December 2011 | 6 | 11.46 | 12.08 | 22 |
| 1st December 2011 | 7 | 12.16 | 12.39 | 23 |
| 1st December 2011 | 8 | 13.47 | 14.02 | 20 |
| 1st December 2011 | 9 | 14.16 | 14.17 | 1 |
| 1st December 2011 | 10 | 14.25 | 14.33 | 8 |
| 1st December 2011 | 11 | 14.33 | 14.36 | 3 |
| 1st December 2011 | 12 | 14.37 | 15.02 | 21 |
| 1st December 2011 | 13 | 15.07 | 15.33 | 26 |
| 1st December 2011 | 14 | 15.36 | 15.45 | 9 |
| 1st December 2011 | 15 | 15.57 | 16.27 | 30 |
| 2nd December 2011 | 16 | 10.02 | 10.36 | 34 |
| 2nd December 2011 | 17 | 10.38 | 10.51 | 13 |
| 2nd December 2011 | 18 | 11.01 | 11.2 | 19 |
| 2nd December 2011 | 19 | 11.22 | 11.34 | 12 |
| 2nd December 2011 | 20 | 11.36 | 12.03 | 27 |
| 2nd December 2011 | 21 | 13.04 | 13.11 | 7 |

| | | | | |
|---|---|---|---|---|
| 2nd December 2011 | 22 | 13.14 | 13.16 | 2 |
| 2nd December 2011 | 23 | 13.3 | 13.44 | 14 |
| 2nd December 2011 | 24 | 13.5 | 14.03 | 13 |
| 2nd December 2011 | 25 | 14.15 | 14.2 | 5 |
| 15th December 2011 | 26 | 10.02 | 10.21 | 19 |
| 15th December 2011 | 27 | 10.21 | 10.58 | 37 |
| 15th December 2011 | 28 | 12.2 | 12.37 | 17 |
| 15th December 2011 | 29 | 12.38 | 12.43 | 5 |
| 15th December 2011 | 30 | 13.34 | 13.52 | 18 |
| 15th December 2011 | 31 | 14.23 | 14.27 | 14 |

Table 15: Observed visitor dwell times at IWM London

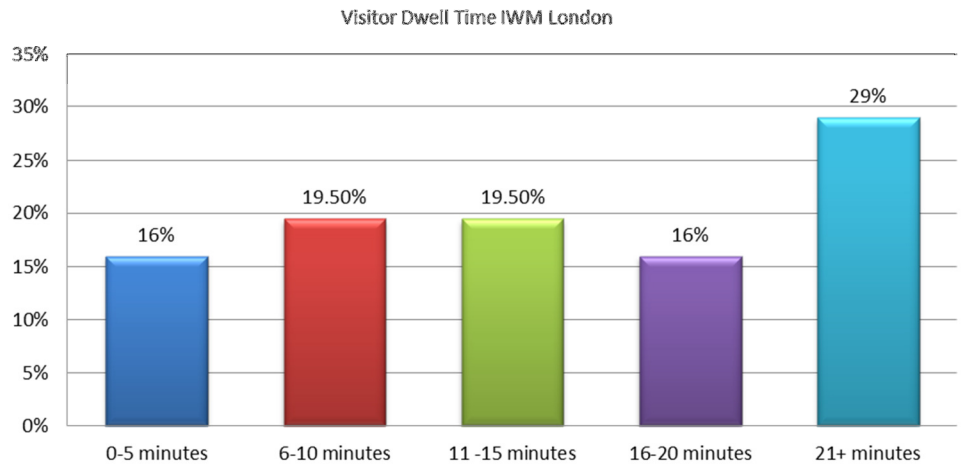



Figure 34: Dwell time in categories in the atrium space at IWM London

Visitors were also rated according to the quality of their engagement with exhibits and interpretation within the atrium space using the following engagement rating rubric (Table 16):

| | |
|---|---|
| 1 | No engagement<br>Passes by |
| 2 | Minimal engagement<br>Pauses, glances at object/label, minimal interest shown |
| 3 | Cursory engagement<br>looks briefly, may touch something in cursory, non-studied way |
| 4 | Moderate engagement<br>Looks, studies with apparent interest; and/or touches, participates in the activity with attention |
| 4 | Extensive engagement<br>Looks or studies with intense interest and/or participates fully, exploring, experimenting |

Table 16: Engagement Rates

Overall, 13% of the visitors were rated as having a high quality of engagement within the large exhibit gallery. 42% of visitors observed were rated under cursory engagement, highlighting brief interest in objects and labels before moving onto the next object in the gallery (Figure 35).

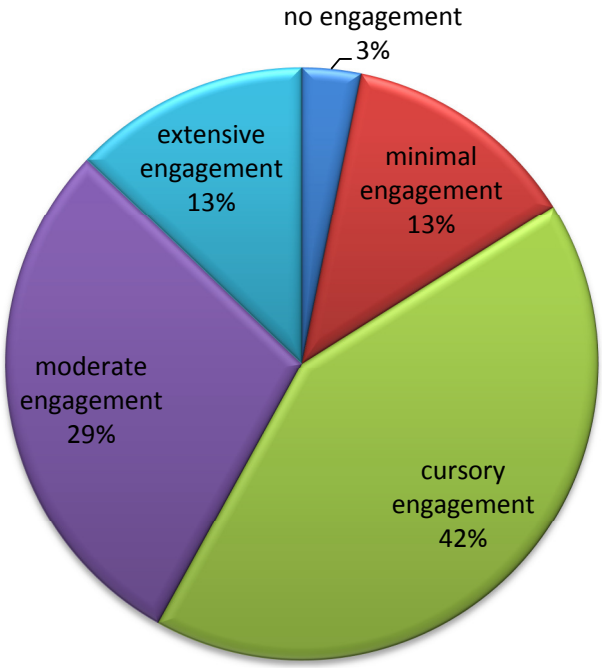



Figure 35: Chart showing percentage of engagement rating at IWM London

## 5.6 CONCLUSIONS

The purpose of this thesis was to investigate digital visitor generated content in the museum space. This chapter aimed to provide data to address the overarching research question focusing on how digital visitor generated content can impact on visitor engagement. Data was collected for a period of nine months from 4th April 2012 to 1st January 2013 in Imperial War Museum London, Lambeth Road. Overall, findings from the analysis of visitor contributions to the Social Interpretation application installed in IWM London show an interesting mix of engagement practices, with a high percentage of noise

contributions highlighting the risk posed to the museum as a result of a 'hands off' approach to moderation.

From an analysis of the visitor contributions themselves it is possible to draw some conclusions about the reasons for visitors choosing to share their views via the SI tablet kiosks. As noted above, most of the contributions fell into a three broad categories: 'on topic', responding to the object or question; 'about the museum', contributions directed towards the museum or exhibition; or 'noise', irrelevant and/or banal responses. It is likely that the motivations for commenting differed for each of these categories. Some 'on-topic' comments involved an opinion or reflection; in others visitors offered a piece of information, whether from personal experience or general knowledge. For both these types of comments, the motivation seems to have been a genuine desire to share a personal statement about the object in question with other visitors. In the case of the 'about the museum' contributions, responses directed at the museum or the exhibition, the nature of the contributions suggested that some visitors treated the screens as a form of electronic visitor book. It can be assumed that some visitors were prompted by their enjoyment of their visit experience to share their view with the museum (rather than with other visitors as such). In other cases, visitors may have wished to interact with the SI tablet kiosks and, finding themselves unsure of what to say, resorted to a generic expression of positive sentiment.

A significant number of visitor contributions posted via the SI tablet kiosks expressed a positive response to the museum and the experience it offers. Although many of these contributions were banal (e.g. "Coolest museum ever"; "Wow great museum"), some were more considered ("The museum is amazing I have learned so much and how interesting to talk to Graham Zeitlin, a child of the war. " and "Thank you, you have given me a great understanding about the first and second world war."). Although this sort of commentary was not the intended output of the Social Interpretation project, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the museum. These visitor contributions indicate that the SI tablet kiosks are a major facilitator in engendering engagement between visitors and the museum. The SI tablet kiosks engage some visitors, merely by their existence in the museum space, and results in a response which neither is about the object generally or a response the prompt question positioned on the tablet screen. In such cases the visitors are actively choosing to leave a response which is about the overall experience of the museum. Jane Audas believes that "visitor comments are a good way to deepen audience engagement with the museum. The fact that visitors can participate is a good thing." (Audas 2013 pers. comm. 10th December). The SI digital visitor generate content kiosks did encourage visitors to feel more connected with the museum although often this

was in the sense of providing an digital visitor book, which was an unintended role of the SI kiosks.

One of the underlying aims of utilising visitor generated content, and in this case Social Interpretation, is to provide visitors with more of a voice, and to enable them to participate in the creation of museum content. In so doing, it is argued, there is the potential to challenge the museum's voice of 'authority' and to enable the democratisation of knowledge. However, whether in practice this re-balancing of the audience/authority relationship is realised, or even seen as desirable is another question. Significantly, social interpretation was not seen to pose a challenge to the voice of the museum due to the quality and type of visitor contributions that were left on the SI kiosks, many of which as we have seen in Table 13, were trivial and banal. It seems that the nature of the comments militated against the construction of a narrative, or discussions, or even a form of knowledge that might have challenged the voice of the museum. Hence, in the main, we can assume that reading other visitor contributions did not didn't motivate visitors to comment themselves, nor did it give them access to extra information, or the opportunity to gain new knowledge and understanding with which to challenge the authorised museum text. However, it is apparent that for a minority, having this added knowledge would have been a valuable addition to the museum experience, especially if the visitor contributions were able to add a

missing piece of information or an extra detail, and so support the museum's interpretation.

It is difficult to report on whether there is a democratisation of knowledge through social interpretation because there is very little data on if visitors commented, or read the contributions of other visitors. Additionally, the IWM London SI corpus data (Figure 25) does show some evidence of the potential for this democratisation of knowledge to happen with 19% of the comments in IWM London being categorised as on topic social interpretation. There is some sharing of information and opinion occurring, however, the degree to which this is leading to the democratisation of knowledge is more questionable. For as we have seen in the corpus many of the comments were one or two word responses and it is hard to see how these would add a different dimension to a visitor's knowledge and understanding.

It was apparent that some visitors were willing and open to reading and contributing to other voices in the museum. Despite the large numbers of noise contributions visitors overall were still able to communicate directly with the wider museum audience. Because of this it is believed that the Social Interpretation project's intention to make collections more relevant, accessible and democratic has been relatively successful, it has enabled visitors to feel engaged and to have a sense of ownership, connection to, and participation with the museum collection. The use of digital visitor generated content in this way signifies a shift in how cultural organisations facilitate and incorporate visitor voices into their

collections. This undoubtedly has a bearing on how cultural organisations act as trusted and authoritarian institutions; how they communicate knowledge to and with visitors; and how they can integrate their role as keepers of cultural content with their responsibility to facilitate access to content.

Analysis suggests that users are willing to take part in a dialogue, and express their views about their visit and individual object via digital visitor generated content applications. It further suggests that in most cases they can be trusted to do so in a thoughtful, serious fashion. There are drawbacks however. It is not possible to quantify individual visitor contributions, so it is impossible to comment on whether or not visitors are adding more than one comment to the SI tablets. The challenges that digital technology and participatory media bring to museums demonstrate a change from a one to many transmission to a many to many interaction, in which museums use their own voice and authority to encourage participatory communication and content creation with visitors.

It is evident from the research that the SI project has only made a limited contribution to amplifying the voice of the visitor at IWM London. Whilst there are examples of participation and content creation, the character of the vast majority of the social interpretation is somewhat lacking in awareness and understanding of the highlight object or the theme discussed in the prompt content, and it is difficult to see how engagement in this form could contribute to the acquisition

and spread of knowledge between visitors, or a pose a challenge to the authoritative voice of the museum. A large proportion of the visitors contributions on the screens were one word statements, and mostly banal and inane. These comments arguably provide little incentive to read them, or for other visitors to formulate their own more engaged contribution. Therefore this could be seen as a hindrance to deeper more focused social interpretation by visitors. Yet, ultimately, by providing visitors with an interactive digital means to contribute in the gallery space, and employing minimal moderation by museum staff, IWM has allowed visitors to 'speak' freely and enabled these comments to be seen and read. It could be argued that, by leaving numerous one word statements like, 'cool', 'awesome' and 'LOL' comments visible, IWM has to a degree allowed their visitors' voices to be heard (Hindman 2008), even if enabling this type of social interpretation was not the original intention of the IWM. Carolyn Royston notes; "we're getting some really engaged comments that relate directly to the object or the question being asked, but we also get some nonsense or trivial comments. That for us [the museum] isn't very useful. However, it is showing engagement with digital technology, which is a positive thing." (Royston 2013 pers. comm. 15th December). Importantly there were examples of social interpretation, from the digital visitor generated content kiosks where it was evident that consideration, emotion and thought had gone into the visitor responses.

The SI project highlights the challenges of implementing digital innovation in a museum environment. In particular it emphasizes the issues of trying to work in an iterative and agile manner in a large national museum, such as IWM. Where the pace of technology projects are misaligned with the creation, development and installation cycles of museums exhibitions. There is a requirement to establish an infrastructure that supports the creation and implementation of innovative digital projects, which can require institutional change, often at a pace that is difficult for the organisation to manage. Institutional change, however, requires a tentative approach to change in a culturally sensitive manner. Communication is key. There is a necessity to manage expectations: not only the expectations of the museum visitors but the institutional expectations. Despite this research highlighting some of the challenges associated with implementing digital innovation projects in a museum environment it has demonstrated that digital visitor contributions can provide valuable information about visitor use of digital technology in the museum space. The open coded content analysis provides a better understanding of the contribution patterns and interaction behaviour of IWM London visitors, and provides a valuable guide for further development and refinement of methods to assess the impact and value of digital visitor generated content in museums.

# CHAPTER 6: STUDY OF VISITOR GENERATED CONTENT IN THE IMPERIAL WAR MUSEUM NORTH

In order to explore the research question of how digital visitor generated content impacts on visitor engagement within a museum context this chapter describes the second iteration of the digital visitor generated content application; Social Interpretation, and explains what it was created to achieve, placed within the institutional context of Imperial War Museum North, Manchester (IWMN). This chapter documents the findings of the second iteration of the twelve month collaborative research project focusing on the Imperial War Museum's (IWM) development and implementation of the Social Interpretation (SI) project. The SI project utilised Research and Development (R&D) and innovative practices, including agile project management principles and a user centred approach to fundamentally challenge the way in which museums interact with, and provide for, audiences. It provides an overview of how the bespoke digital visitor generated content system; Social Interpretation was designed, tested, implemented and evaluated in IWM North (see chapter 5 for the discussion of Social Interpretation in IWM London and the technical details on the Social Interpretation system can be found in appendix 2). We then consider the elements of the data collection and analysis methods used. Finally we look at the process of evaluating and analysing the results of the data and what this means for digital visitor generated content in museum spaces.

As discussed in chapter 5 the overarching aim of the SI project was to explore how social media models could be applied to museum collections and exhibition interpretation, offering new models for public engagement and the construction of visitor generated content or social interpretation. Carolyn Royston Head of Digital Media at IWM describes the project aim;

> "The project was about how we could involve our audiences in digital engagement with the museum. We wanted to make our objects social and to give opportunities for people to comment…and talk about our objects" (Royston 2013 pers. comm. 11th February).

## 6.1 RESEARCH SETTING

This chapter presents and discusses the findings from one of the branches of the SI Project. The Social Interpretation project began at IWM in November 2011 and ran until January 2013. The second iteration of the project was developed and installed in IWM North on 16th July 2012. This data collection for this study was conducted between July and December 2012, and involved the Imperial War Museum North[131], part of the family of Imperial War Museums.

In order to contextualize the results from the case study, this section provides contextual information about the IWM North from which data

[131] http://www.iwm.org.uk/visits/iwm-north

was collected from archiving visitor generated content contributions. This information is important to place the subsequent results within context in order to inform the analysis and interpretation of the results.

The Imperial War Museum North (IWMN), Manchester is purpose built and deliberately constructed to make visitors feel uneasy and is organized around a single Main Exhibition Space with 6 separate 'silos' placed within the Main Exhibition Space. IWMN was designed by Jewish-American architect Daniel Libeskind (IWM 2011, p.5). IWMN opened on the banks of the Manchester Ship Canal, Salford Quays on 5 July 2002 (IWM n.d.). It is the youngest of IWM's five branches and the first outside the south-east of England (IWM n.d.). IWMN has been described as an example of deconstructivist architecture, which is a subset or development of post-industrial architecture, a sense of controlled chaos is conveyed through architectural forms (Shaw et al. 2008, p.227). The architecture of the building is significant to the museum visitor experience as the building 'purposely unsettles' visitors in order to prepare them for the emotional experiences in the exhibition space (IWM 2011). The architectural principle behind the IWMN is of a world shattered by conflict and then put back together as three separate 'shards', each of which represents either land, sky or sea; the three arenas of war (Shaw et al. 2008, p.227). The permanent exhibitions are housed in the museum's first-floor Main Exhibition Space (MES) within the earth shard. The MES consists of a chronological display which runs around the gallery's perimeter walls

and six thematic displays in 'silos' within the space. The floor of the gallery is curved, gradually dropping away like the curvature of the Earth. Within the MES, described as "a cavernous space" (Hughes 2002) a number of large artefacts are displayed; including a Russian T-34 tank, a United States Marine Corps AV-8B Harrier jump jet, a 13-pounder field gun which fired the British Army's first shot of the First World War and a central steel from the World Trade Centre (Figure 36). In addition to the physical exhibits, the walls of the gallery space are used as screens for a digital projection of hourly audio-visual presentations called the Big Picture Show, which explore themes related to modern conflict. The collection of data for this chapter was undertaken in the Main Exhibition Space.

The IWMN moves from a global perspective of war to the stories of individuals from Britain and around the Commonwealth (IWM 2011) aiming to encourage visitors to challenge their view of war. Critics have lauded the architectural vision and ambition of Daniel's Libeskind's building, and others have criticised the IWMN's perceived vapidity and exhibition spaces (Hughes 2002; Emig 2007). Matthew Hughes (2002) refers to the IWMN as, without its multimedia, "just a box with a restaurant and a viewing platform"; Rainer Emig (2007) attacks the conservatism of the displays and concludes that "Despite the architectural gesture of the building, it … ultimately houses the ingredients of a standard war museum" (Emig 2007, p.60). Bagnall and Rowland (2010) defend the IWMN as a pivotal twenty first century

museum, as it "deliberately effects such dialectical tensions in the exhibition space rather than simplistically attempting to solve recent critical issues in museum studies" (Bagnall and Rowland 2010, p.53). Bagnall and Rowland go on to analyse how the architecture and exhibition space of the IWMN promotes an effect of 'playful discombobulation' upon visitors, encouraging them to contemplate the dynamics of war (2010, p.59). The Social Interpretation project, housed within IWM North, works with this 'playful discombobulation' to encourage visitors to respond to provocative questions about war and contemporary conflict.


Figure 36: Floor Plan of Imperial War Museum North

## 6.2 DESCRIPTION OF THE SOCIAL INTERPRETATION APPLICATION

In the description of the Social Interpretation application presented in Chapter 5 we discuss the three main components to Social Interpretation; a custom bespoke application that is built in flash running on 6 tablets in the *A Family in Wartime* exhibition at IWM London, a custom bespoke mobile application built for Apple's iOS and Android platforms entitled 'Scan and Share'; and an online commenting, collecting and sharing interface entitled 'My IWM'.[132] In IWM North the Social Interpretation application runs on 4 touchscreen computers in the Main Exhibition Space; The SI application installed in IWM North is the second iteration application (for details of the first iteration installed in the *A Family in Wartime* exhibition at IWM London see Chapter 5). Four 23 inch touchscreen computer kiosks were developed and installed in in the Main Exhibition Space in July 2012 (see Figure 37 for the floor plan with positioning of the Social Interpretation kiosks). Each of the four touchscreen kiosks was linked to a highlight museum object and contained one of four provocative questions written by the IWMN Exhibitions Manager with support from the SI team (Table 17). In comparison to the textual content for the SI kiosks in IWM London (Table 13) the text here is much more concise.

[132] Details about the mobile and online components of SI can be found in appendix 2.

| Object | Title Prompt | Initial Prompt |
|---|---|---|
| **T-34 Tank** | Mass produced killing machine? | How would you feel being inside the T-34 Tank with four other people? |
| **Baghdad Car** | A terrorist attack on your street? | How would you react to a bomb attack on your high street? |
| **Royal Horse Artillery 'E' Battery 13 Pounder Field Gun** | A light load with heavy consequences? | How would you feel if you had to operate this field gun? |
| **Dennis Fire Fighting Trailer Pump** | Put out the fire? | What do you think your first reaction would be if you found yourself in an air raid? |

Table 17: Textual content for the 4 touchscreen kiosks in the Main Exhibition Space IWM North

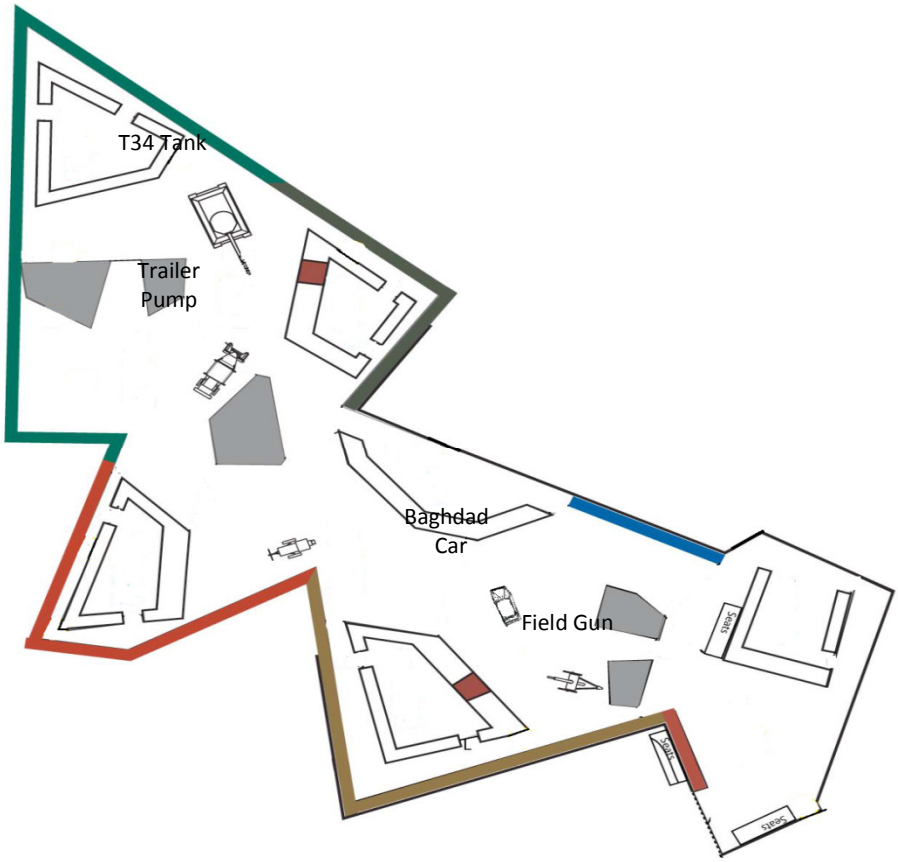



Figure 37: IWMN Floor Plan showing position of highlight objects and Social Interpretation kiosks

In IWM North, following in-situ usability testing and observations of the London SI tablets, the kiosks were iteratively re-developed in terms of content and interface design (Figure 38)[133]. The screen size increased to 23 inch touchscreen PCs as the tablets used previously were deemed to be too small for social interaction and were not robust enough for sustainable gallery use. Four 23 inch touch screen computers were installed next to four standalone large exhibits in the main exhibition

[133] Evaluation of the SI kiosk usage at IWM London indicated that visitors were confused by the dual purpose of the interface; to provide information as the 'museum's voice' and to provide a space for visitors to comment (Ross 2012). With this in mind, the SI kiosks were re-designed to better suit visitor need for IWM North. Furthermore, the objects had existing caption labels at IWM North whereas the exhibits used in the *A Family in Wartime* exhibition at IWM London were reliant on the kiosk to provide museum label information.

hall of IWM North (Figure 37). These included a T-34 tank, a fire tender, a field gun and 'Baghdad, 5 March 2007', Jeremy Deller's installation featuring the bombed wreckage of a car. The changes in content and interface design primarily relate to the main screen that visitors encounter. Previously there were two principal screens (see Chapter 5 Figure 22 and 23). In the second kiosk iteration, the 'museum voice' and 'visitor voice' exist on one screen (Figure 38). The visitor encounters a screen where an image of the object and its name is presented in the top left corner. Underneath, a provocative question is posed which is designed to generate comments. The remainder of the screen is devoted to inputting and showing comments (Figure 40). Touching the photo of the object triggers a larger display of the picture, but does not generate any additional text. The same interaction functions of like, dislike, reply and remove found in the first iteration of SI, were still visible.

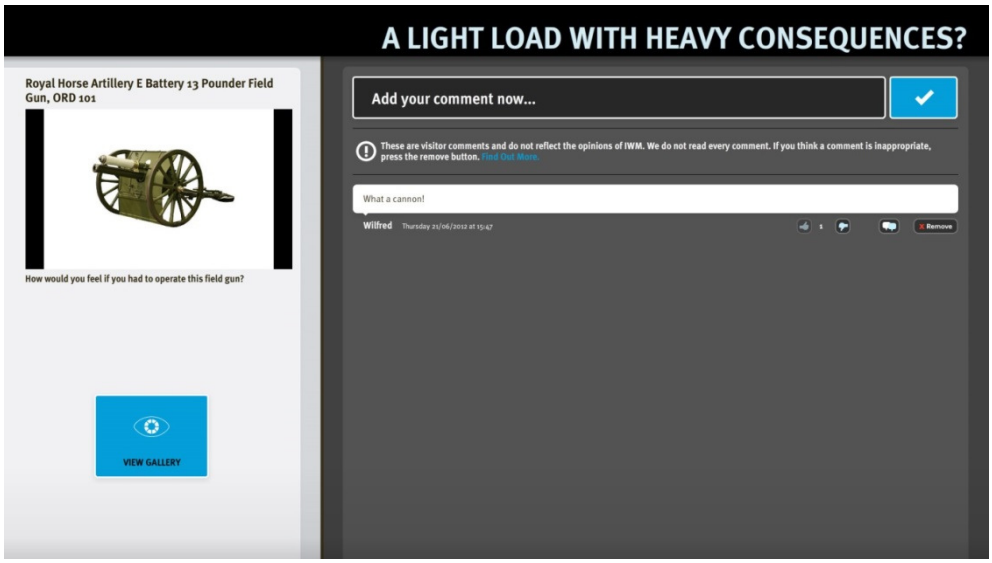



Figure 38: Interface design of second iteration kiosk in IWM North.


Figure 39: Example object with SI kiosk in the Main Exhibition Space; T-34Tank

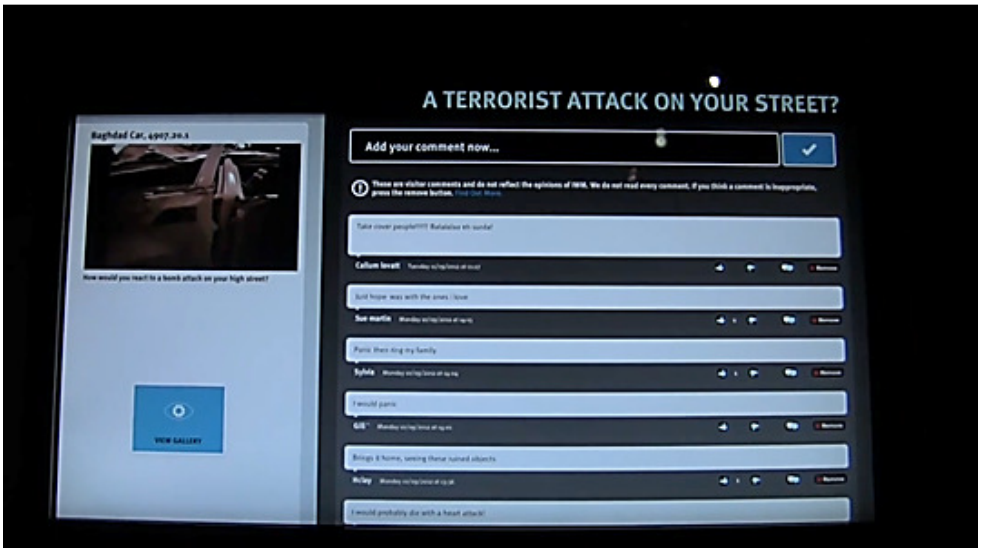



Figure 40: Interface design of second iteration kiosk in IWM North, highlighting the comment display

As with the first iteration of SI in IWM London, visitors' contributions from IWM North were synchronised with the IWM Collections

Information Integration Middleware (CIIM) [134] and can be accessed on the collections search pages of the IWM website[135] to allow visitors to contribute to the continuing discussion away from a museum setting.

## 6.3 DATA COLLECTION AND ANALYSIS METHODS

Data from the four Social Interpretation kiosks was collected by archiving contributions from July to December 2012. Each individual visitor contribution was instantaneously uploaded to the IWM CIIM master database, followed by the IWM website pulling the data about each SI prompt question from the master database and integrated those comments within IWM Collection Search online. The comments were then aggregated together based on the location, device and object in the museum. Data was collected in the same way as discussed in chapter 5. This resulted in a corpus of 8791 visitor contributions, with a total of 39,001 words containing 6,339 unique words, providing a rich dataset for the analysis of visitor engagement. Visitor contributions were categorized qualitatively using open coded content analysis where each comment was read and categorized, for details of this method see section 3.4 For the purpose of this study, various quantitative measures were used such as analysing the frequency of comments according to date and time, comparing comment rate between the four

[134] Collections Information Integration Middleware (CIIM) (http://www.k-int.com/products/ciim).
[135] http://www.iwm.org.uk/collections/search

social interpretation kiosks, and using suitable text analysis tools to interrogate the corpus of visitor contributions.

Additionally field observation and visual recording of visitors using the visitor generated content applications as they visited the museum spaces was collected. Data collection was undertaken over a four week period and generated a substantial corpus of naturalistic observations and materials; data that included visitors of different ages, those alone and with others, and visitors who came on different days and at different times. Because the observation sample did not ask visitors to complete the written survey, the demographic data is minimal and is not considered in the following discussion. Visitor observation sessions were undertaken at IWM North on the 19th and 20th March 2012. From this process, 10 visitor behaviour maps were produced. Video-based recording of visitors interacting with the QRator application was also conducted. Data collection was undertaken between the 6th-10th August 2012. A total of 29 individual observations were recorded, ranging in length from 00:02 seconds to 04:55 minutes.

It is also important to acknowledge that the author has been embedded within the SI project since its inception as a project partner and was involved in all strands of its work at both IWM North and IWM London. We consequently had access to a large grey literature from inside the project: draft and discussion documents, minutes of project board, advisory panel and workgroup meetings, and project management

archives have all been used. An additional unique perspective comes through the access the author had being involved in the creation, development and implementation of the SI project, which provided rich insights how a large organisation operates and deals with technical matters, innovation, visitor experience, and institutional change.

## 6.4 ANALYSIS OF DIGITAL VISITOR GENERATED CONTENT

The largest proportion of the comments in the corpus fell into one main category (Figure 41); 'on topic' (42%); triggered predominately by the Social Interpretation interface and the provocative questions posed by the museum staff. 'On topic' visitor contributions were seemingly direct responses to the question asked by the SI kiosk or a direct response to the object of focus in the SI interpretation. The 'on topic' contributions highlight that visitors have not only read, understood and interacted with the SI kiosk, but have also viewed or studied the museum object and are compelled to participate in creating their own museum interpretation and experience.

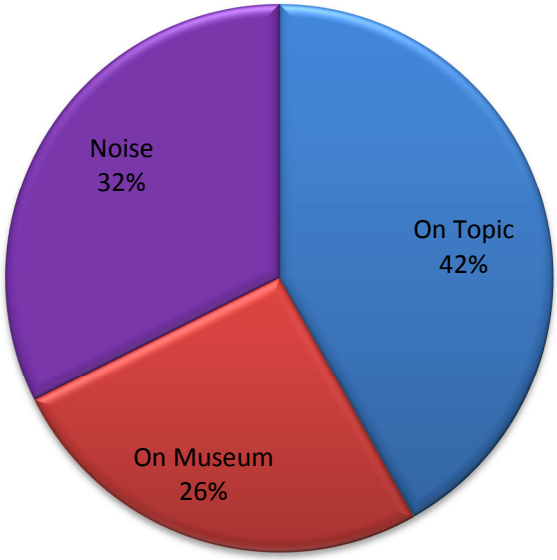



Figure 41: Percentage of SI IWM North visitor contributions by Category. The majority of the comments in the corpus fell into comments 'on topic'.

There is a high degree of variability in the nature of visitor contributions made under the on topic category. For example it includes visitors providing longer evaluative responses to the SI kiosk prompt question, "I would really panic. I am quite young so i havent experienced any thing like this in a major country. I was only a toddler during 9/11 so i dont remember" [*sic*][136], as well as those who engage with the visual aspect of the museum object "I love the bright red colour of the trailer, it is amazing" to the shorter comment "Huge tank". The 'on topic' category in particular is helpful in understanding how visitors interacted with the social interpretation technology, responded to the

[136] Visitor contribution was in response to the SI prompt: "how would you react to a bomb attack on your high street?"

prompt questions provided by the museum and engaged with the museum objects. The high percentage of on topic contributions does suggest that visitors are inspired to share their own experiences, thus co-constructing a personal, public multiple interpretation of museum objects.

A large proportion of the visitor contributions were deemed 'nonsense' by the museum, predominately entailed one word statements like 'cool', 'good' and 'awesome'. Though there are a range of negative comments including 'scared', 'scary' and 'sad'. Although it might be easy to dismiss these styles of comments as irreverent and facile, it nevertheless clearly is a noteworthy form of visitor contribution. As discussed in the previous chapter it is debatable whether one word answers can provide an insight into the impact of digital technology on visitor experience. However we consider these one word answers as short evaluative comments which should be considered as important evidence of visitor engagement. In particular, the high percentage of opinion terms within these short evaluative comments does suggest that the opportunity provided by SI for visitors to give their opinion, has had a positive impact on their engagement with the museum. For the purpose of this study the one word statements were classified as significant comments about the museum or exhibition experience and were categorised as contributions 'about the museum' (26% of contributions). The types of comments in the 'about the museum' category varied considerably; ranging from long experiential comments, "I think that iwm is

interesting [*sic*] and is important people visit this great place to experience war and get a good knowledge of what war does to people" to visitors focusing on particular elements and objects in the exhibition, "I liked the film bit, and the puzzle were u [*sic*] could make shapes with the black and white blocks. Thank you xox" and the one word statements discussed above. This again presents the issue of whether a digital technology used in this way promotes an opportunity for visitors to make meaning from their whole experience, rather than engage with the exhibit specific content and interpret the exhibitions themselves.

The noise category, for the purpose of this study, reflects visitor contributions which are seemingly spam and trolling comments (32%). The noise category represented a significant risk for the Imperial War Museum. Simon (2010) notes that when a "contributory museum project relies on visitors' contributions to succeed, it generates both high risk and high institutional investment. If participants don't act as requested, the project can quite publicly fail" (Simon 2010, p.208). From the outset of the project a major concern of the project team was that the reputation of IWM could be harmed if the engagement of visitors was not managed appropriately. One of the most frequent concerns museums voice about contributory platforms is the fear that visitors will create content that reflects poorly on the institution, either because it is hateful or inaccurate (Simon 2010, 222). Fundamentally, this concern is about loss of control. When museums do not know what to expect from visitors, it's easy to imagine the worst. Therefore much

effort was invested in interrogating the risks involved and this resulted in a model of moderation practice for SI which was used in both IWM London and IWM North.

Additional thought was also given to the selection of objects and the prompt questions associated with these. In IWM North, objects were sought by the exhibitions manager that were conceived of as holding the capacity to act as a prompt for discussion, yet minimise the chances of generating deeply problematic dialogues and unwanted headlines in the media. Just as in IWM London, there were no incidents involving problematic dialogues, with very few as what might be seen as 'high risk' visitor responses being made – the usage of racial slurs or pro-Nazi propaganda for example. Therefore it appears that the potential problem of hateful or inaccurate commenting has not become one in reality. This is of particular importance as the objects in question in IWM North could be perceived as 'risky' or controversial (in particular the Baghdad Car which highlights the conflict in Iraq[137] which is in contemporary consciousness of visitors) due to the nature of collections held by IWM North, which focuses on current conflict as well as the first and second world war.

Despite utilising social moderation as a means of dealing with visitor generated content, where the visitors themselves could moderate potentially inappropriate comments made through the SI kiosks, the IWM SI team deemed it necessary to 'garden' or post-moderate some of

[137] The Iraq War was an armed conflict in Iraq between 2003 and 2011.

the 'about the museum' contributions in order to achieve a better visitor experience. This gardening was devised as a design tool to sculpt the spectator experience of the visitor generated content. There were two main reasons for undertaking post moderation. Firstly to remove content that was perceived as inappropriate or offensive and secondly to create a visitor experience on the SI kiosks which presented a focused set of contributions. Carolyn Royston notes;

> We were very interested in the bigger question of post moderation. The concern about what people might comment and whether it might be inappropriate. One of the big R&D parts of this project was to test that theory that we could post moderate, that we could trust our audiences and that there would respond. To date we have had very few comments that we [the museum] have had to remove (Royston 2013 pers. comm. 11th February).

Social moderation as a tool does appear to work to some extent with 4514 comments being actively reported by visitors to the gallery floor. This, however, was not utilised enough to remove all of the comments deemed as 'nonsense' by the museum. A member of the IWM digital media team was put in to position to post-moderate comments on a daily basis in an attempt to remove visitor contributions deemed as 'nonsense' comments by the museum leaving the 'on topic' comments to be more visible on the SI kiosks. However adequate resource was not allocated appropriately and many of the visitor contributions deemed

as ‘nonsense’ by the museum remained on public view. This moderation aspect is interesting as it highlights what both the museum and visitors identified as an inappropriate comment. Consequently, this textual data provides some insight into the visitor and museum outlook and beliefs around what should be allowed to be ‘said’ in a museum. For the purpose of this study, the post-moderated comments have been included in their pre-moderated state, in order to see the original visitor engagement with the SI technology.

When comparing the individual SI prompt questions, it can be seen that certain questions gained more visitor contributions than others (Figure 42).

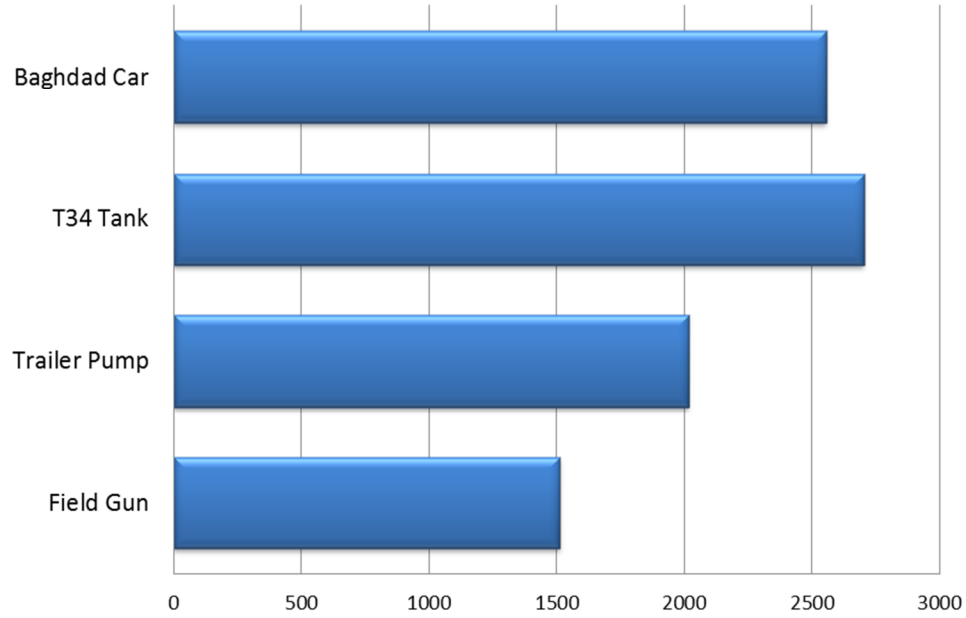



Figure 42: Total number of visitor contributions for each highlight object, IWM North

When further focusing on the individual highlight objects and SI prompt questions it is possible to see that some prompt questions produce higher levels of on topic visitor contributions then others (Figure 43). The T-34Tank and Baghdad Car prompt questions received the most contributions by visitors which focused on the topic raised by the museum (1210 and 1259 visitor contributions), followed by the Trailer Pump (706 visitor contributions) and the Field Gun received the least on topic contributions (493). The disparity between the T-34Tank, Baghdad Car and the Field Gun could be attributed to physical location (Figure 37- both the T-34Tank and Baghdad Car are in open space), but it more likely that both the T-34Tank and Baghdad Car are not only larger objects and therefore more visually striking to visitors but they are also easier to directly associate with visitors previous experiences, own perspectives and understanding of the exhibition theme.

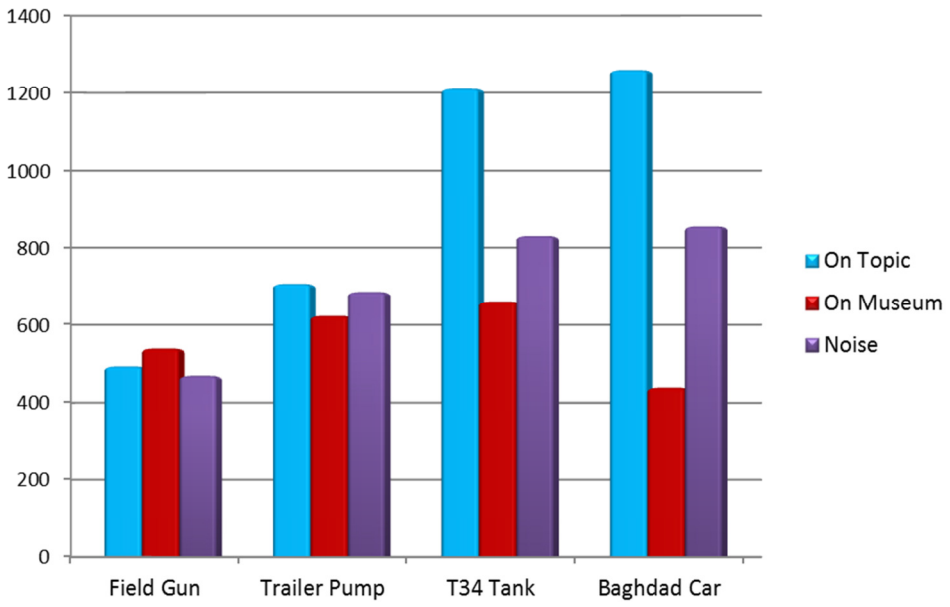



Figure 43: Category breakdowns from each of the four Social Interpretation kiosks

Analysing the frequency of comments according to date and time (Figure 44), comparing comment rate between the individual prompt questions also produces some interesting results.

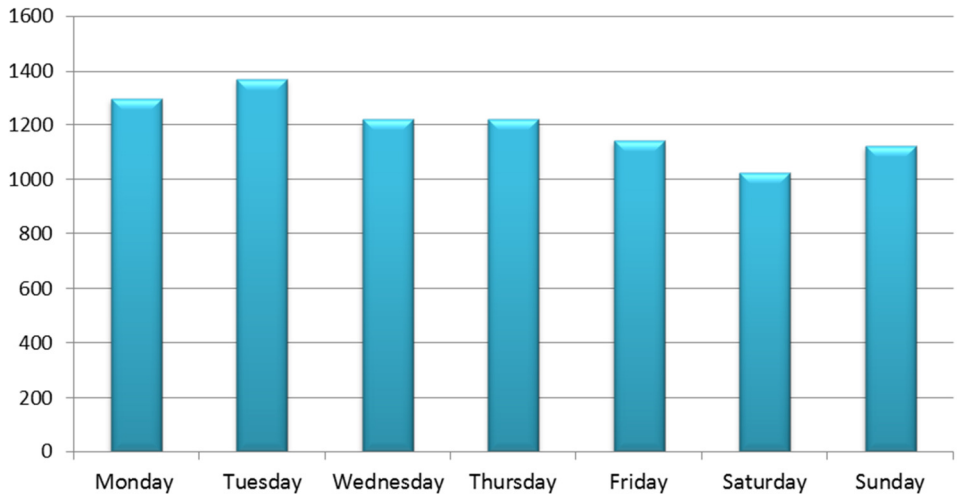



Figure 44: Daily frequency of visitor contributions, IWM North

Firstly it is possible to see that Tuesdays are more popular for visitors engaging with the SI Kiosks, Saturdays have lower participation (Figure 44). However there is a reasonable spread of visitor contributions throughout the week. IWM North shows similar daily trends to the Grant Museum (Chapter 4) and IWM London (Chapter 5) with Tuesday's being the most popular day for visitors entering a contribution into the digital visitor generated content application and all three case studies show a decline in the number of contributions at the weekend. Unfortunately it has not been possible to access the daily visitor figures for the three case studies, therefore only basic assumptions can be made for the peak in Tuesdays and decline at the

weekend, the reasons for this could be due to the museum being busy with the number of school groups in the museum space on Tuesdays.

In terms of actual visitor contribution practice, Figure 45 displays commenting levels in total for the visitor contributions which can then be compared to the category group of 'on topic' whilst all kiosks at IWMN were in operation (Figure 46). From this it can be seen that there are some spikes in visitor contribution activity. The 2nd November 2012 received the highest number of contributions with 237 incidences. This was followed by the 29th October and 30th October with 212 and 210 respectfully. The 2nd October also has a high number of contributions with 180 and 1st November with 195 visitor contributions. SI contributions by visitors began quite slowly when the SI kiosks were introduced into the Main Exhibition Space, with contributions becoming more regular from mid-August and reaching a peak at the beginning of November. When looking at the incidence of on topic visitor contributions there is a peak between 28th October and 2nd November 2012, reaching a high point of 121 contributions on the 2nd November. This indicates that just over half of the visitor responses left on that date were on topic and focused on the prompt questions and highlight objects. There are also relatively high spikes on 7th October (79 on topic contributions) and the 27th and 30th August with 69 on topic contributions each.

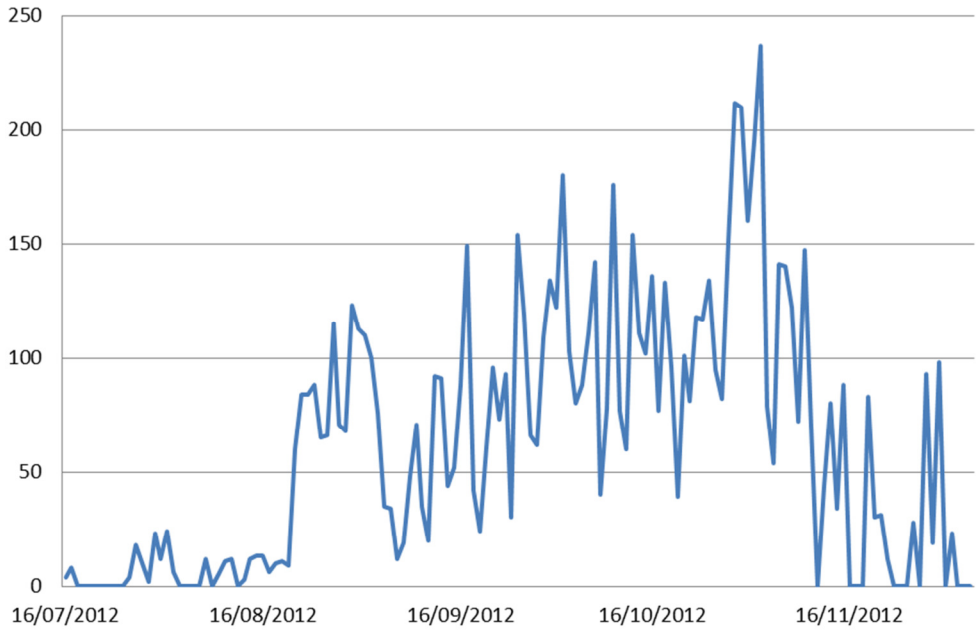



Figure 45: Total number of visitor contributions to IWM North by date

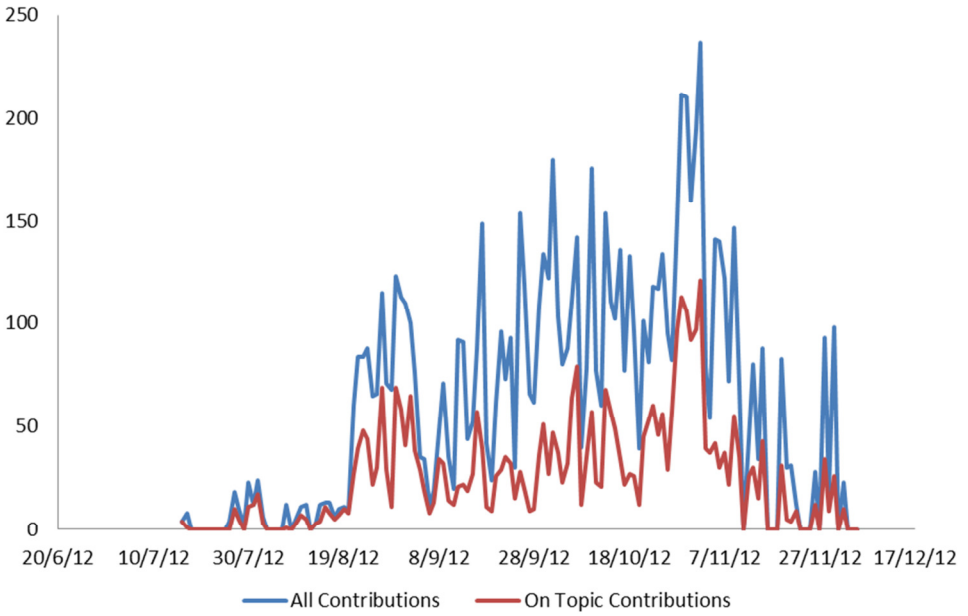



Figure 46: Comparative analysis of 'on topic' contributions against the total number of contributions, IWM North

If a focus is made upon on topic contributions by each SI Kiosk and highlight object similar spikes can be seen (Figure 47). All the Si Kiosk

objects display a spike in November. However both the T-34Tank and Field Gun trail off from Mid-November.

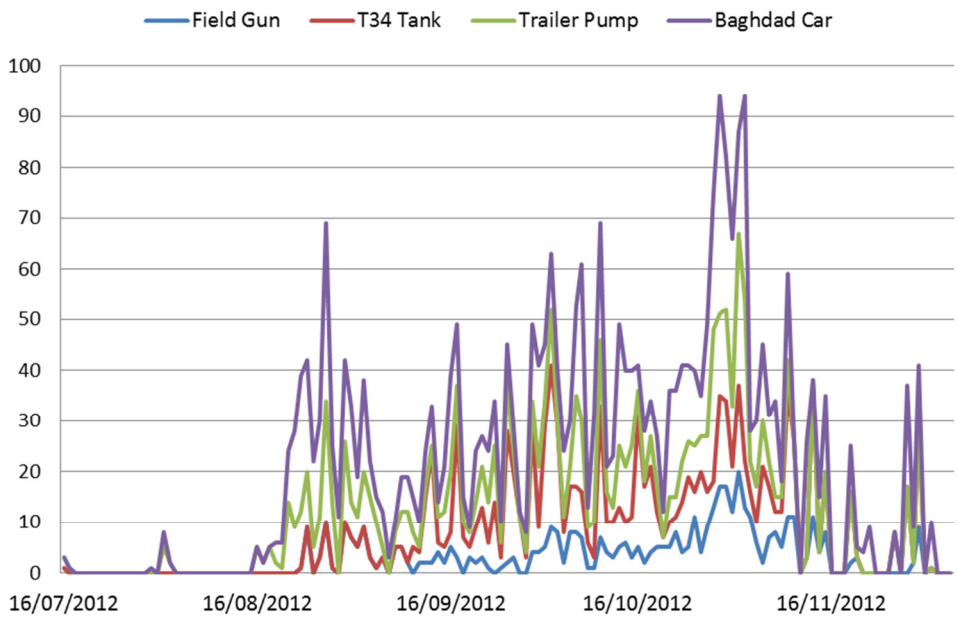



Figure 47: Comparative analysis of 'on topic' contributions by SI Kiosk objects, IWM North

As discussed in chapter 5, an update to the SI software occurred on the 21st August 2012, this also affected IWM North. The update contained a series of changes aimed to resolve a number of issues with the SI software including connection problems and comments not being saved to the SI database. The issue with comments not being saved correctly appears to have affected all of the SI kiosks simultaneously at both institutions. This has implications on the data analysis and results, although due to the later installation of SI in IWM North, the software issues previous to the 21st August, had only affected 1 months (16th July to 21st August) worth of data, in comparison to the 5 months at IWM London.

It is considered that all kiosks were equally affected, on the basis that they comprised identical hardware and software (See appendix 2 for technical specifications). Each kiosk can be assumed to have lost the same proportion of visitor contributions as each other. For example, take Figure 42 the pattern of visitor contributions would be the same (The T-34 Tank would still have received the highest number of contributions and the Field Gun received the least number of visitor contributions), but the absolute values may be higher. Therefore, analyses of contribution data made earlier in this chapter can still be considered as representative and useful for the purpose of this thesis (Figures 31-44). Due to the software issue, the timelines of visitor contributions (Figure 45, Figure 46, Figure 47) may not show an accurate representation of visitor contributions between the 16th July and the 21st August 2012, relative to contributions after this date. This is on the basis that only a proportion of contributions were archived before the 21st August, giving assumed relative, but not absolute frequency data.

### 6.4.1 TEXT ANALYSIS OF DATA

Text analysis tools were also used to interrogate the corpus of visitor contributions. It was assumed that frequent terms from the SI visitor contributions would reflect the topics and themes being discussed in the physical museum space. The IWMN SI data was run through a

commonly used text analysis tool Voyant[138], to highlight the commonly used words in the visitor contributions, and to enable a Sentiment Analysis to take place. The table below highlights (Table 18) the most commonly used words in the IWMN visitor contributions corpus from the 16th July to the 5th December 2012. Words are shown in exact frequencies, excluding words like 'the' and 'a' (using the Taporware English Stop Words List[139]). 'Cool' is by far the most commonly used word, with a frequency of 700. Other key words demonstrate that visitors appear to be positively engaged in the museum experience. The remaining most frequent words in the corpus seem to highlight positive visitor contributions as well as some of the highlight objects and emotions discussed in the Main Exhibition Space: good (339), like (326), run (293), tank (278), amazing (267), scared (224), love (198) and car (196). Conversely if the nature of the repeated contributions are considered, it does reinforce the museum perspective that the majority of existing comments on the screens were 'nonsense' or banal, providing little incentive to other visitors to read them or spend time formulating individual views relating to the prompt question. As discussed in previous chapters it might be easy to dismiss these styles of comments as irreverent and facile, particularly out of context when only focusing on the frequencies of the words, but on the contrary we believe that these word frequencies highlight a significant form of visitor contribution and an indicator of engagement. The words with

[138] http://voyeurtools.org
[139] TAPoR is a Text Analysis Portal for Research to a range of tools used in sophisticated text analysis and retrieval. http://www.tapor.ca/ The TAPoRware stop word list is a list of words which are filtered out before processing textual data.

the highest frequencies; cool (700 count), good (339 count) and like (326) are all positive sentiments expressed by visitors, highlighting the positive experience they are having in response to the museum.

| Word | Count | Word | Count | Word | Count |
|---|---|---|---|---|---|
| cool | 700 | lol | 143 | gun | 67 |
| good | 339 | war | 141 | best | 66 |
| like | 326 | awsome | 132 | sick | 66 |
| run | 293 | looks | 127 | away | 64 |
| tank | 278 | scary | 125 | help | 63 |
| amazing | 267 | feel | 123 | intresting | 61 |
| scared | 224 | nice | 118 | old | 61 |
| love | 198 | people | 117 | life | 60 |
| car | 196 | interesting | 111 | world | 59 |
| really | 185 | sad | 103 | red | 56 |
| hi | 171 | epic | 100 | safe | 56 |
| think | 168 | hide | 87 | scream | 54 |
| awesome | 164 | place | 78 | omg | 53 |
| wow | 163 | shelter | 76 | hello | 50 |
| great | 162 | im | 72 | just | 50 |
| museum | 147 | want | 69 | thats | 46 |
| big | 146 | family | 67 | | |

Table 18: Table highlighting the most popular words. Words and phrases are spelled and capitalised exactly as they appeared in the IWM North SI corpus

When the IWM North SI corpus is split into the three categories; 'on topic', 'about the museum' and 'noise', it is possible to compare the frequencies of words. The 'on topic' visitor contribution corpus contains high frequencies of strong emotional terms; 'scared', 'sad', 'like', 'love', and 'terrified'. These terms relate directly to the prompt question. This suggests a high level of emotional engagement to the prompt question and highlight object on display. The 'about the museum' visitor contributions corpus contains high frequencies of positive adjectives; 'good', 'amazing', 'wow', awesome' and 'great'. The high frequency words in the 'noise' category contain banal terms like 'hi', 'lol' and 'poo'. From these three corpus' it is possible to see a stark different in the amount of words in each. The 'on topic' visitor contribution corpus has a total of 22490 words whereas the 'about the museum' and 'noise' corpus contain a much lower total word count (8304 words and 8119 words). The length of comment may also be used as an indicator of engagement- if we assume that those who are interested in an issue or topic may wish to write at greater length. Indeed the average length of comment increased between categories. The 'noise' category had an average of 2.7 words, comments on the museum had 3.7 words and visitor contributions on topic had an average of 6.2 words. This is pleasing, since it suggests that visitors were inspired by the questions to engage with topics in a relatively complex fashion and leave longer responses and when visitors entered noise contributions, these were kept short. Additionally when compared to the SentiStrength results, which classifies for positive and

negative sentiment on a scale of 1 (no sentiment) to 5 (very strong positive/negative sentiment), highlights that the 'about the museum' visitor contributions were on average more positive in sentiment (2.23 positive) whereas the 'on topic' comments had a more weighted negative response (1.24 positive; 2.61 negative). This suggests more engaged texts often contain a mix of positive and negative sentiment, in contrast to less engagement which is more likely to produce a single sentiment result.

## 6.5 ANALYSIS OF OBSERVATIONS

Imperial War Museum North is a larger space than both the atrium at IWM London and the Grant Museum space so it is not surprising that the average visit time is almost double that of the other two museums with the average time being 39 minutes (Table 19). The majority of visitors observed showed moderate to extensive engagement with the objects and the written interpretation. Tracking visitor movements and behaviour within the Main Exhibition Space highlighted certain areas or exhibits which provided the most prolonged engagement in IWM North:

- Big Picture Show
- Harrier Jump Jet
- T-34Tank

Associated behaviours included looking and studying with apparent interest, visitor group discussions, pointing and taking photographs.

| date | Visitor observation number | entry time | exit time | dwell time in gallery (minutes) |
|---|---|---|---|---|
| 19th March 2012 | 1 | 10.25 | 11.07 | 42 |
| 19th March 2012 | 2 | 11.1 | 11.39 | 29 |
| 19th March 2012 | 3 | 11.46 | 13.15 | 29 |
| 19th March 2012 | 4 | 13.26 | 14.47 | 81 |
| 19th March 2012 | 5 | 14.55 | 15.42 | 47 |
| 20th March 2012 | 6 | 10.14 | 11.17 | 63 |
| 20th March 2012 | 7 | 11.22 | 11.53 | 31 |
| 20th March 2012 | 8 | 11.54 | 12.2 | 26 |
| 20th March 2012 | 9 | 13.08 | 13.15 | 7 |
| 20th March 2012 | 10 | 13.18 | 13.57 | 39 |

Table 19: Observed visitor dwell times in IWM North

Visitors were rated according to the quality of their engagement (see Table 16 for engagement rates). The majority of visitors observed displayed moderate to extensive engagement throughout the museum

visit, displaying intense interest in the objects, both the large highlight objects and the smaller objects in the wall cases and silo areas.

Observing and tracking visitors has become one of the most consistently used methods in museum evaluation because it is able to indicate the extent to which visitors are behaving in the expected and intended manner. The observation sessions highlighted that visitors spend a long time in the museum spaces and show a range of behaviours and levels of engagement. At IWM North the visitors observed were very engaged and displayed moderate to extensive levels of engagement. This is similar to the visitors observed in the Grant Museum (see section 4.5). Whereas in IWM London (see section 5.5) the majority of visitors observed displayed a cursory level of engagement; where visitors would look briefly at an object or interpretation labels in a cursory or non-studied way. As a method for exploring the kinds of visitor behaviour characteristics that occur during a museum visit it only produce basic insights into behavioural responses and more general understanding in to levels of engagement. If we were to undertake field observations again, a much more through study would be undertaken solely focussing on "exhibit face" observations in an attempt to understand visitor behaviour characteristics and engagement rather than mapping behaviours throughout the visit.

## 6.6 ANALYSIS OF VIDEO_BASED OBSERVATIONS

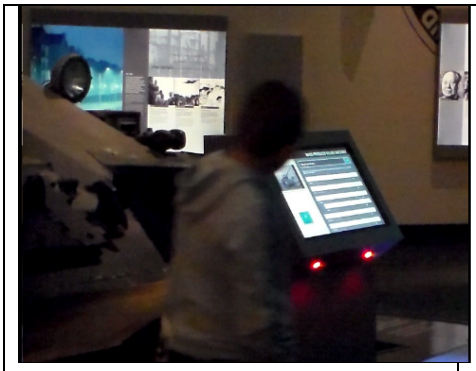
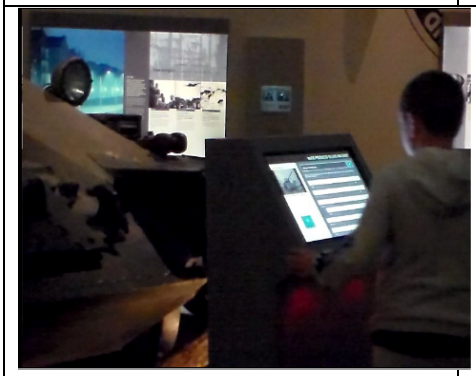
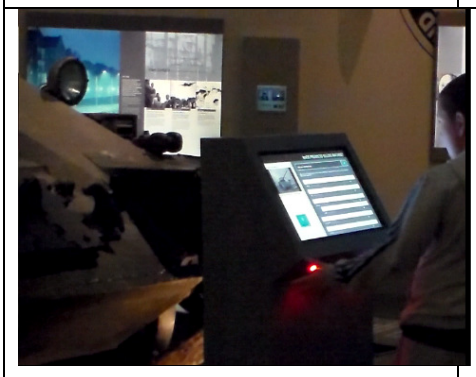
This section discusses a number of video fragments to begin to unpack how visitor's use of gaze, gestures and posture whilst approaching, examining and interacting with the Social Interpretation visitor generated content technology can highlight about visitor engagement.

The large corpus of audio and video data collected at Imperial War Museums North were analysed in August 2012 were initially segmented and indexed using time and date markers, along with the name of the museum. The segmenting of data was initially "event-based" (Leinhardt and Knutson 2004: 80); that is, based upon the use of actions. A segment in the research was considered to start when a visitor starts heading towards the specific visitor generated content application, while it ends when interest and visitors shift away from the application. Repeated viewing of the video data led to the identification of different varieties of visitor conduct which could be categorised into levels of engagement. Therefore the segmenting of video data was then organised using a four point scale; minimal engagement, cursory engagement, moderate engagement and extensive engagement.

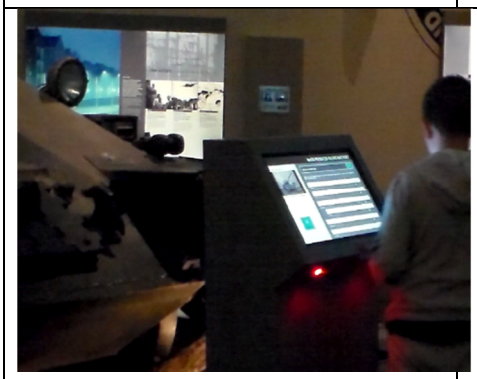
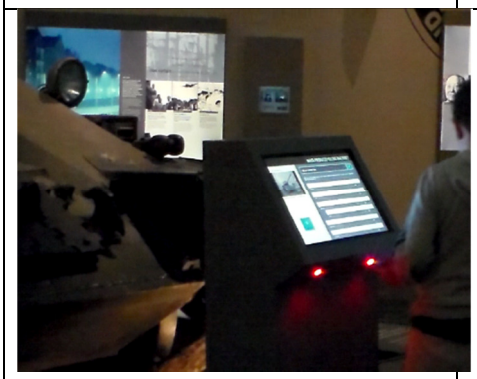
### 6.6.1 MINIMAL ENGAGEMENT

For the purpose of this exploratory video-based study minimal engagement is classified as when a visitor pauses, glances at the visitor generated content kiosk or tablet, but shows minimal interest in content or digital device. The following fragment (Table 20) was recorded in the Main Exhibition Space at the Imperial War Museum North in front of the T-34Tank. A young visitor (YV1) enters the video frame from the left. YV1 approaches the Social Interpretation Kiosk, glances briefly at the kiosk and then moves on to look at the textual object interpretation. What is notable in this fragment is that the YV1 has not shown any interest in the T-34Tank at all.

| Screen Shot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:00.9 | A young visitor (YV1) enters the video frame from the left. |

| | | |
|---|---|---|
|  | 0:00.9 - 0:01.4 | YV1 shift in posture, hit tilts and gaze moves to focus on kiosk. |
|  | 0:01.4 - 0:01.9 | YV1 begins to turn body towards kiosk, left hand reaches up to side of kiosk. |
|  | 0:02.0 - 0:02.6 | YV1 left hand touches side of kiosk, gaze shifts to kiosk screen, body posture shifts face forwards towards the kiosk. |
|  | 0:02.6 - 0:03.4 | Hand position shifts to the underside of the kiosk, shift in gaze towards upper section of screen (0:02.4). |

| | | |
|---|---|---|
| | | Shift in posture onto right side of body, moves gaze further back from the screen (0:02.6) further shift in posture to the right (0:02.8), hand position shifts along the understide of the kiosk, posture shifts on to left side of body, brings YV1 closer to the kiosk screen, gaze still fixed on screen. |
|  | 0:03.4 - 0:03.9 | Hand is removed from kiosk (0:03.4), slight shift in posture towards kisok, head moves to shift gaze slightly down the screen (0:03.6), posture turns slightly away from kiosk, gaze |

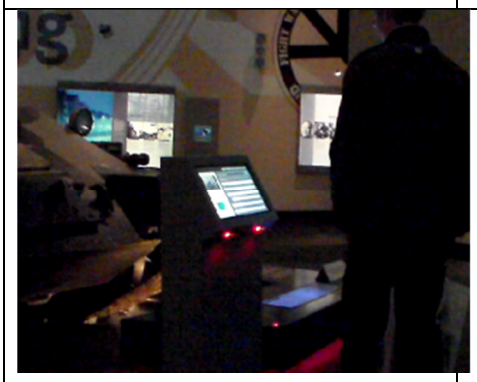
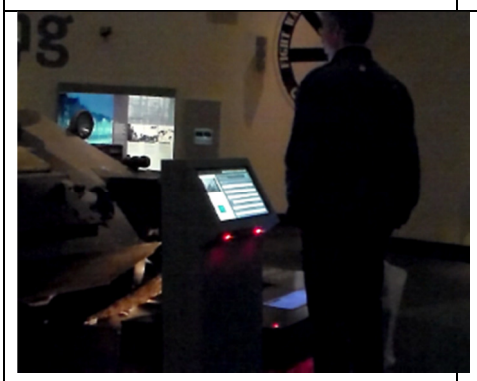
| | | |
|---|---|---|
| | | moves to the right (0:03.8). |
|  | 0:03.9 - 0:04.5 | YV1 takes a right step away from the kiosk, gaze moves to right hand side of kisosk, left hand touches underside of kiosk (0:04.3), gaze focused downwards. |
|  | 0:04.5 - 0:05.6 | YV1 takes step away from kiosk, gaze focused downwards at museum object label. |
|  | 0:05.6 - 0:06.3 | Takes step forward and posture becomes hunched, gaze focused on museum label, posture shifts round |

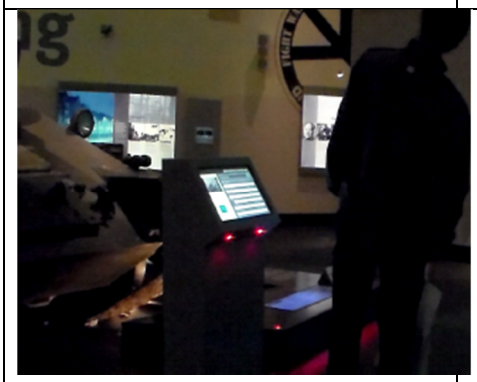
| | | |
|---|---|---|
| | | to face the label. |
|  | 0:06.3 -<br><br>0:06.7 | YV1 moves out of shot. |

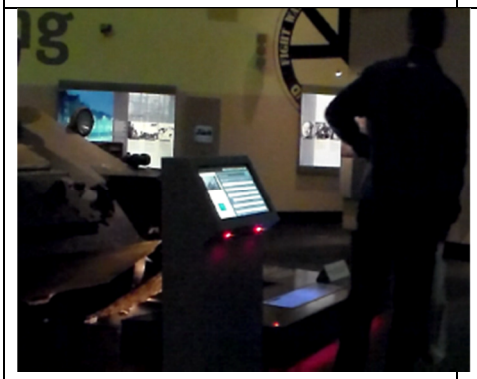
Table 20: Transcript of minimal engagement at the T-34Tank Social Interpretation Kiosk

### 6.6.2 CURSORY ENGAGEMENT

For the purpose of this exploratory video-based study cursory engagement is categorised as when a visitor looks briefly at the visitor generated content application, and or may touch something in cursory, non-studied way. The following fragment (Table 21) was recorded in the Main Exhibition Space at the Imperial War Museum North in front of the T-34 Tank. An adult visitor (AV4) enters the video frame approaches kiosk, their gaze is focused on the screen, suggesting that they are reading the screen content, the adult visitor then changes their gaze to look at object, then looks at ceiling, and finally withdraws from kiosk and moves on to look at the textual object interpretation. Agreement in the literature suggests that gaze and attention are tightly coupled (Hoffman 1998), implying a direct relationship between how visitors look at museum objects and their thinking about them. The fact that AV4 read the Social Interpretation content and then focused his gaze on the T-34 Tank is a positive indication that he has become engaged in thinking about the object in light of the interpretation offered on the kiosk.

| Screen Shoot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:01.1 | Adult Visitor 4 (AV4) approaches kiosk. |
|  | 0:01.1 - 0:16.8 | AV4 takes forward step towards kiosk, stops, gaze focused on kiosk screen. AV4 remains in this position for 16 seconds. |
|  | 0:16.8 - 0:17.9 | AV4 shifts gaze from kiosk screen up to object. |

| | | |
|---|---|---|
|  | 0:17.9 - 0:18.4 | Takes a step backwards, tilts head upwards, gaze focused on object. |
|  | 0:18.4 - 0:19.4 | Weight shifts onto right foot, tilts head upwards, gazes upwards to ceiling. |
|  | 0:19.4 - 0:20.1 | Shift in posture to accommodate upwards gaze. |
|  | 0:20.1 - 0:20.8 | Body turns to the right away from kiosk, shift in posture. |

| | | |
|---|---|---|
|  | 0:20.8 - 0:21.5 | Places left hand in pocket, steps away from kiosk. |
|  | 0:21.5 - 0:22.4 | Walks to the right, gaze focuses forward. |
|  | 0:22.4 - 0:23.7 | Continues walking to the right, gaze shifts to the left slightly. |
|  | 0:23.7 - 0:24.6 | AV4 walks out of shot. |

| | | |
|---|---|---|
|  | 0:24.6 - 0:27.8 | AV4 re-enters shot, gaze focused downwards towards museum label, walks towards museum label. |
|  | 0:27.8 - 0:34.2 | Takes forward step towards museum label, stops, gaze focused downwards on museum label. AV4 remains in this position for 7 seconds. |

Table 21: Transcript of cursory engagement at the T-34Tank Social Interpretation Kiosk

### 6.6.3 MODERATE ENGAGEMENT

For the purpose of this exploratory video-based study moderate engagement is categorised as when a visitor looks or studies with

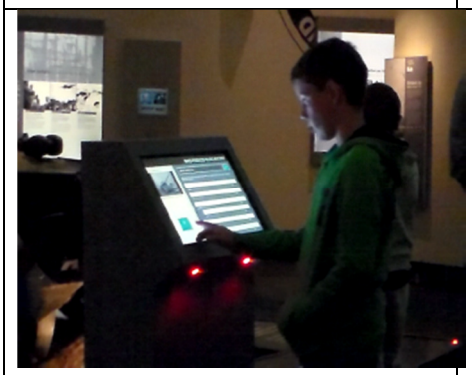
apparent interest; and/or touches, and participates in the activity with attention. The following video fragment transcript (Table 22) from IWM North focuses on a young visitor (YV3) who walks past the Social Interpretation kiosk initially and then becomes interested in the kiosk. The young visitor first looks at kiosk then at moves his attention to the object (T-34Tank) briefly. The young visitor then looks away and then re-focuses back on the kiosk. The young visitor then begins to interact with the kiosk, firstly by touching touches picture gallery 'button', after looking at image which appears on the screen, the young visitor swipes right and then swipes left causing the image on the screen to disappear. The young visitor then touches picture gallery 'button' again, and then touches to close image. As another visitor (AV5) enters the video frame, the young visitor points to the kiosk screen and object to inform the other visitor. He then looks at object, looks up at ceiling, and then has a verbal dialogue with a visitor who is out of shot. The young visitor then looks away and walks out of shot.

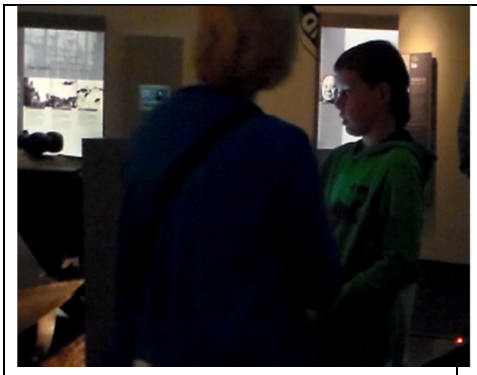
| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:24.1 - 0:26.1 | Young Visitor (YV3) enters shot from left. |
|  | 0:26.1 - 0:26.4 | Glances briefly in direction of kiosk. |
|  | 0:26.4 - 0:27.3 | Walks past and out of shot. |
|  | 0:27.3 - 0:31.3 | Remains out of shot. |

| | | |
|---|---|---|
|  | 0:31.3 - 0:32.0 | YV3 re-enters shot and gaze is focused on the kiosk screen. Takes paces towards kiosk. |
|  | 0:32.0 - 0:33.1 | Change in body positioning, moves to face the kiosk straight on. |
|  | 0:33.1 - 0:33.8 | gaze is focused on kiosk screen, then shift in gaze to focus on object (T-34Tank). |
|  | 0:33.8 - 0:34.5 | Gaze comes down to look back at kiosk screen. |

| | | |
|---|---|---|
|  | 0:34.5 - 0:34.9 | Shifts body position - turns to right away from screen. |
|  | 0:34.9 - 0:35.7 | Shifts body position - faces full right. |
|  | 0:35.7 - 0:36.7 | Takes a step back. |
|  | 0:36.7 - 0:37.6 | Head turns to focus back on screen, gaze is downward, hands are in pockets. |

| | | |
|---|---|---|
|  | 0:37.6 - 0:39.8 | *Camera position moves to focus on YV3* |
|  | 0:39.8 - 0:41.2 | YV3 goes to touch 'image button' - shift in posture to get closer to kiosk. Image appears on screen - gaze focuses on screen, hand rests on kiosk mount. |
|  | 0:41.2 - 0:42.2 | Gaze moves to the right of the screen, swipes screen from right to left. |
|  | 0:42.2 - 0:43.5 | Swipes screen from left to right. Image disappears from screen. |

| | | |
|---|---|---|
|  | 0:43.5 - 0:44.3 | Shift in posture - gaze move to left handside of screen, touches 'image button' looks away to left at something out of shot - verbal dialogue. |
|  | 0:44.3 - 0:45.5 | Turns body to left away from kiosk, hand holds kiosk mount. |
|  | 0:45.5 - 0:46.5 | Looks back to kiosk, taps screen, image disappears. |
|  | 0:46.5 - 0:47.7 | AV5 enters shot, YV3 turns body towards AV5, whilst gaze still focused on screen, small pointing gesture. |

| | | |
|---|---|---|
|  | 0:47.7 - 0:48.4 | AV5 walks further into shot, gaze focused on YV3, YV3 uses a pointing gesture at the screen. |
|  | 0:48.4 - 0:49.2 | YV3 looks at AV5, and makes a larger pointing gesture. |
|  | 0:49.2 - 0:49.7 | YV3 looks up at object. AV5 moves out of shot. |
|  | 0:49.7 - 0:50.4 | Looks up at ceiling, and then looks towards the camera, then glances behind. |

| | | |
|---|---|---|
|  | 0:50.4 - 0:52.0 | YV3 looks to left, out of shot, - shakes head and has verbal dialogue with someone out of shot 'no' - one finger touching bottom of kiosk screen mount. |
|  | 0:52.0 - 0:53.2 | Body turns to the right, gaze moves to the right away from the kiosk screen. |
|  | 0:53.2 - 0:55.2 | Turns and walks out of shot. |

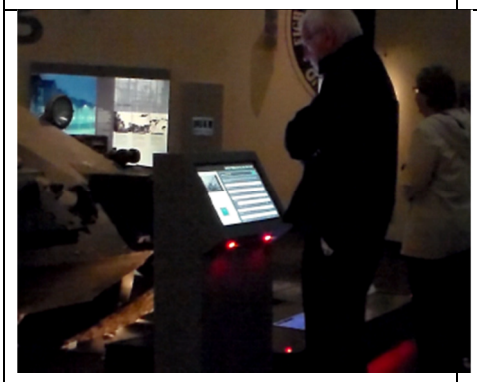
Table 22: Transcript (A) of moderate engagement at the T-34Tank Social Interpretation Kiosk

This is the first instance of a visitor displaying pointing gestures in relation to the Social Interpretation kiosk. A range of previous research has highlighted the use of pointing gestures, as a collaborative practice

that facilitates a task by making it easier for participants to discern a particular aspect of the relevant complex environment. In particular, there have been a few publications exploring aspects of interaction emerging in work environments such as the London Underground control room (Heath and Luff 1992), archaeological sites (Goodwin 2003), classrooms (Kääntä 2007) and shop counters (Clark 2005). As we saw in Chapter 3 there has been a noteworthy lack of published research on how visitors use gestures to interact with museum objects. A few authors have discussed pointing as a specific gesture, Borun et al. (1997) listed different behaviours as learning indicators for family science learning in the museum; one of those was pointing. Griffin (1999), developed a list of behavioural indicators of student engagement in learning processes in a museum setting. Pointing gestures were considered as an indicator of learning and ''sharing learning with peers and experts'' (Griffin 1999, p.116). Recently, Meisner et al. (2007) found that visitors observe others at interactive exhibit-faces in order to adjust their own interaction and performance. Pointing at objects was among those means of showing others how to manipulate the exhibits. This is echoed by the work of Christidou (2013) who focuses on pointing as visitor performance in museums. It is interesting to be able to see pointing gestures being used in relation to the visitor generated content application, however in this fragment a solitary pointing gesture did not appear to have the desired effect of sharing the experience, as the adult visitor did not engage with the young visitor.

In the next video fragment transcript (Table 23) an adult visitor (AV2) is focused on the kiosk and appears to be reading visitor comments on the screen. The adult visitor changes his stance slightly, presumably to be able to read more of the comments. He then briefly looks at the object, and then begins to walk away from the kiosk, he then turns back to check kiosk, and finally walks away from kiosk, pauses and then moves out of shot.

| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:04.9 | Adult visitor 2 (AV2) looks at kiosk content, appears to be reading visitor comments on screen. Arms folded across chest, head position tilted downwards. Gaze focused on kiosk screen. |

| | | |
|---|---|---|
|  | 0:04.9 - 0:13.4 | Slight change of stance, leans forward, gaze still focused on kiosk screen. |
|  | 0:13.4 - 0:14.9 | Shift in gaze to look briefly at object. |
|  | 0:14.9 - 0:15.6 | AV2 begins to walk away to the left. |
|  | 0:15.6 - 0:16.3 | Continues to walk away, pauses, and turns back to the kiosk screen. |

| | | |
|---|---|---|
|  | 0:16.3 - 0:16.9 | Turns body position back towards the kiosk, gaze focused on kiosk screen. |
|  | 0:16.9 - 0:17.9 | Takes a step back to re-focus stance and gaze on kiosk screen. |
|  | 0:17.9 - 0:18.3 | Slight shift in posture, gaze still focused on kiosk screen. |
|  | 0:18.3 - 0:19.2 | Head turns away towards the left, turns body and starts to walk away to the left. |

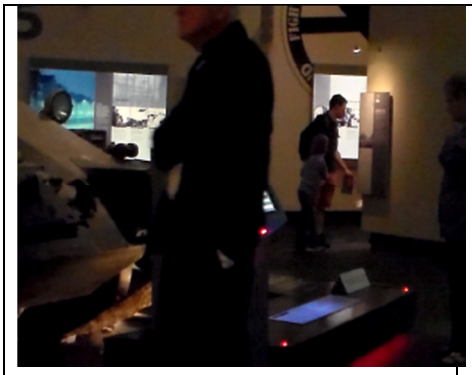
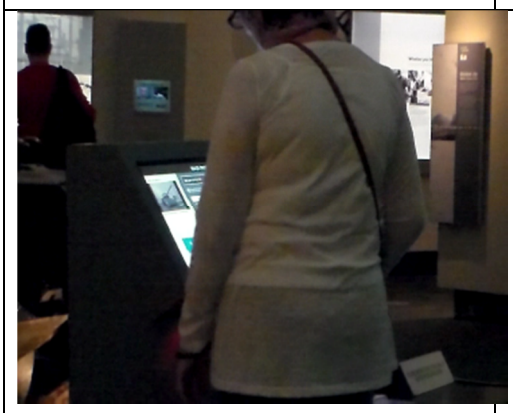
| | | |
|---|---|---|
|  | 0:19.2 - 0:20.7 | Walks to the left, pauses - gaze is focused on something out of shot. |
|  | 0:20.7 - 0:23.8 | Walks out of shot. |

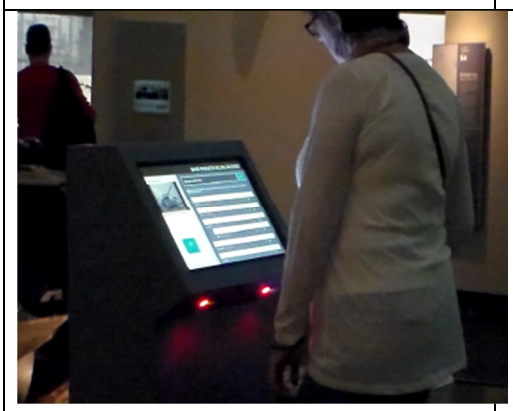
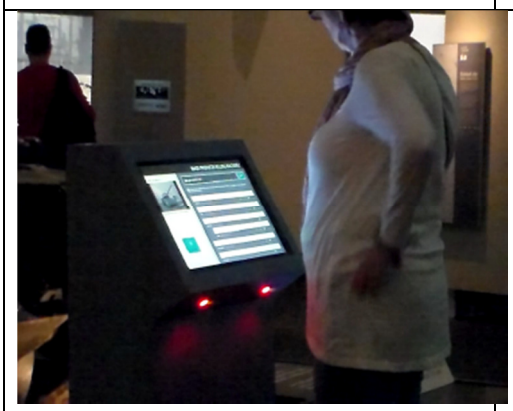
Table 23: Transcript (B) of moderate engagement at the T-34Tank Social Interpretation Kiosk

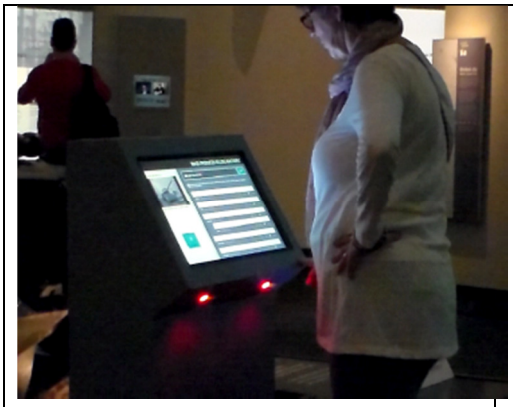
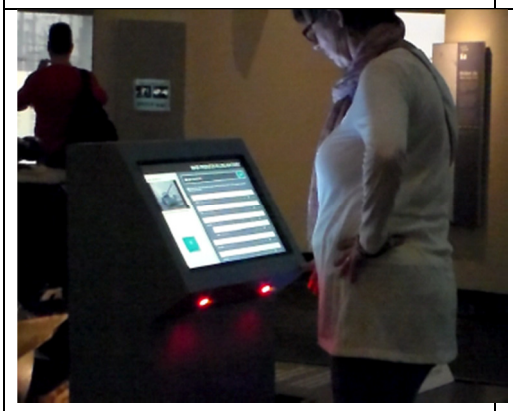
### 6.6.4 EXTENSIVE ENGAGEMENT

Extensive engagement is categorised as when a visitor looks or studies with intense interest and/or participates fully, exploring, and experimenting. The following video fragment transcripts showcase two different types of extensive engagement; involving shifts in gaze and posture from an individual visitor and a visitor contributing a comment.

The next video fragment transcript () from IWM North focuses on the shifts in gaze and posture of a lone visitor.

| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:30.5 - 0:32.1 | AV8 enters shot from left and approaches the kiosk. |
|  | 0:32.1 - 0:34.7 | Turns body towards kiosk, head tilts downwards, gaze focused on kiosk screen. |

| | | |
|---|---|---|
|  | 0:34.7 - 0:39.2 | Slight shifts in posture and gaze (appears to be orientating herself). |
|  | 0:39.2 - 0:43.7 | Gaze focused on screen. |
|  | 0:43.7 - 0:45.8 | Change in posture, place left hand on hip (appears to be a comfort pose), gaze focused on screen. |
|  | 0:45.7 - 0:49.5 | Places right hand on side of kiosk mount. Gaze is focused on top right of screen. |

| | | |
|---|---|---|
|  | 0:49.5 - 0:53.1 | Gaze shifts to centre of screen. |
|  | 0:53.2 - 1:00.1 | Slight shifts in posture, gaze remains focused on screen. |
|  | 1:00.1 - 1:02.9 | AV8 appears to go to touch screen, but moves to touch head with her left hand. |
|  | 1:01.6 - 1:04.5 | Moves hand to her mouth, shifts in posture. |

| | | |
|---|---|---|
|  | 1:02.9 - 1:07.1 | Touches the "picture gallery button", looks at image on screen. |
|  | 1:07.2 - 1:21.8 | Both hands are positioned on the kiosk mount, lots of minimal head movements focusing on the kisok screen image (possibly waiting for the image to do something. 1:10.0 moves left hand from kiosk mount to down by side of body. |
|  | 1:21.9 - 1:25.9 | Turns head to the right, looks down towards museum textual interpretation, takes |

| | | |
|---|---|---|
| | | a step away from kiosk, looks up briefly at object and then back down towards the textual interpretation. |
|  | 1:25.9 - 1:27.2 | Moves out of shot. |

Table 24: Transcript (A) of extensive engagement at the T-34Tank Social Interpretation Kiosk

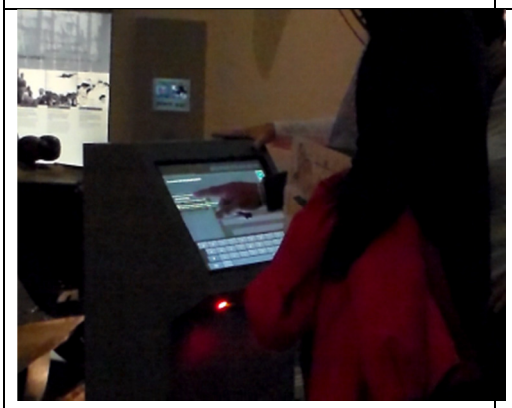
The Adult Visitor approaches the Social Interpretation kiosk, focuses her gaze on the kiosk and shifts here posture in order to orientate herself towards the kiosk. The Adult Visitor's directed gaze suggests that her attention is solely focussed on the content on the SI screen. There are recurring incidents of shifts in posture. The Adult Visitor's continual shifts in posture and slight movements may result in revealing and seeing the kiosk in specific ways. Specifically, the Adult Visitor's positioning and proximity to the SI kiosk could be allowing for the negotiation of access to the instance of attention hook on the screen. Therefore shifts in posture could indicate that the visitor is moving

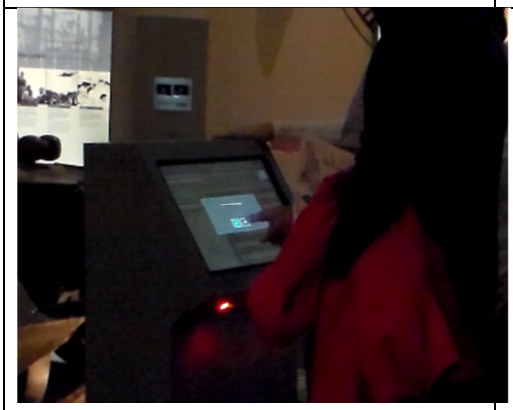
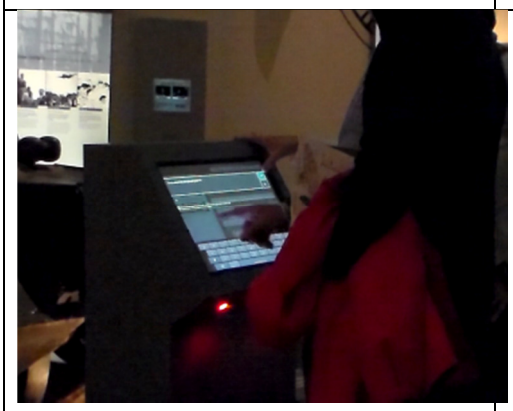
from reading one visitor contribution to another. How visitors position themselves, which aspects of the exhibit they focus on could be some of the means they use to shape their perceptual experience.

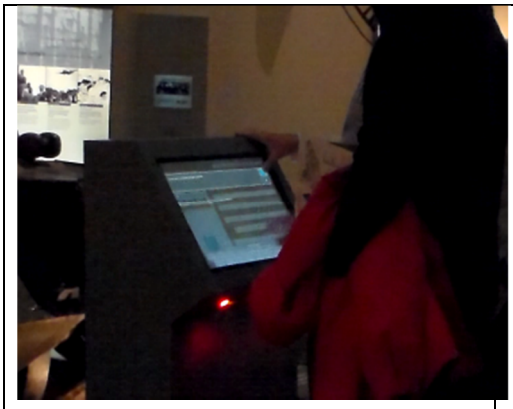
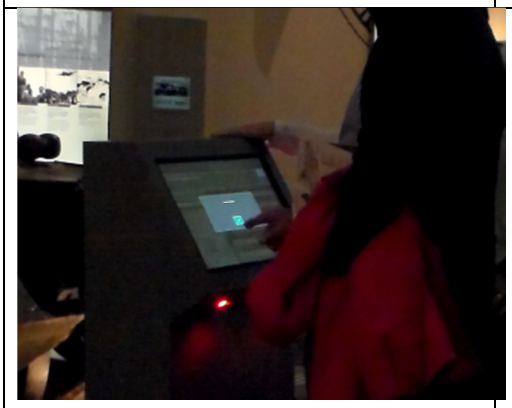
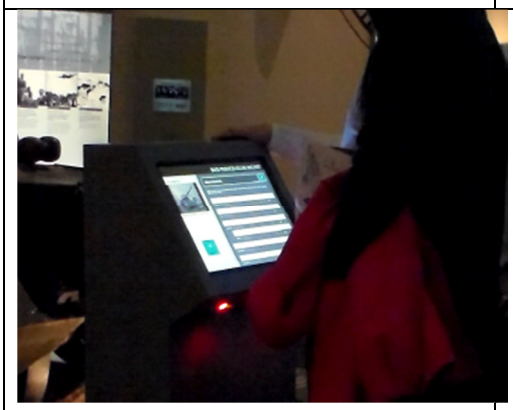
At 1:02.9 the Adult Visitor interacts with the screen by touching the 'picture gallery button' causing a larger image of the T-34tank to appear on screen. AV8 spends 14.6 seconds with her gaze directed at the image. This is an interesting behaviour considering the large physical object of the Tank is also directly in front of the visitor. There appears to be a disconnect between the SI screen content and the physical object in this visitors behaviour. Regardless of the lack of visual engagement with the physical object there is extensive engagement with the visitor generated content on the SI kiosk itself.

The final video fragment transcript (Table 25) from IWM North presents two adult visitors deeply engaged with the visitor generated content application and is our first clear representation of a visitor contribution being inputted into the Social Interpretation kiosk.

| Screenshot | Timespan | Content |
|---|---|---|
|  | 0:00.0 - 0:01.6 | Adult Visitor 7 (AV7)looks at kiosk screen, touches the 'add comment here'. |
|  | 0:01.6 - 0:25.9 | *input screen and keyboard appear* AV7 begins to input comment using one finger. |
|  | 0:25.0 - 0:30.3 | Another visitor enters shot (AV8), AV7 is still inputting a comment using the onscreen keyboard. |
|  | 0:30.3 - 0:36.1 | AV8 leans closer to the kiosk screen to view what AV7 is typing. AV8 rests his hand on top of the kiosk mount. |

| | | |
|---|---|---|
|  | 0:36.1 - 1:32.6 | AV7 continues to input comment, slight shifts in posture to accommodate typing. |
|  | 1:32.6 - 1:33.3 | AV7 shift in posture towards AV8. |
|  | 1:33.3 - 1:40.8 | AV7 turns back to face kiosk screen. |
|  | 1:40.8 - 1:42.9 | AV8 moves thumb towards the 'tick - submitt' button, as AV7 points to 'name entry area' of the screen. Touches 'name'. |

| | | |
|---|---|---|
|  | 1:42.9 - 1:50.1 | *screen changes to allow name input* AV7 begins to input name using on screen keyboard. |
|  | 1:47.3 - 1:49.4 | AV7 touches 'tick-submit' *accept pop-up appears* |
|  | 1:49.5 - 1:53.7 | AV7 points to pop-up and touches 'ok button'. |
|  | 1:53.6 - 1:56.1 | *screen changes* AV8 moves thumb towards 'tick-submit button' AV7 points to left hand side of screen. |

| | | |
|---|---|---|
|  | 1:56.1 - 1:58.5 | AV8 touches 'tick - submit button'. |
|  | 1:58.5 - 2:01.3 | AV7 touches 'ok button'. |
|  | 2:01.3 - 2:05.8 | Both visitors focus gaze on screen. |
|  | 2:05.8 - 2:10.4 | AV8 scrolls down visitor comments on screen. |

| | | |
|---|---|---|
|  | 2:10.4 - 2:16.4 | AV7 scrolls down visitor comments. |
|  | 2:16.4 - 2:26.3 | AV8 scrolls down visitor comments, AV7 adjusts map under his left arm. shifts in posture. AV7 points at comment on screen. |
|  | 2:25.7 - 2:28.4 | AV7 touches and drags to pull down the top of the comment screen. |
|  | 2:28.5 - 2:35.0 | Both visitors turn to the right and walk away out of shot. |

Table 25: Transcript (B) of extensive engagement and comment input at the T-34Tank Social Interpretation Kiosk

This fragment is deemed to be extensive engagement due to the decision to actively participate in Social Interpretation by contributing their own response to the visitor generated content application.

Both video fragment transcripts highlight the diversity of forms extensive engagement with digital visitor generated content can take; from lone content viewing to extensive pointing and hand gestures during a social visit and even contributing a visitor response. There is an ingrained assumption in the term 'visitor generated content' that in order to be extensively engaged a visitor must be generating content. This is not the case. Visitors' can be extensively engaged in consuming content. It is not imperative for visitors to be actively involved in generated content in order to be fully engaged in the experience. Unfortunately this 'intangible' engagement cannot be recorded from the archived visitor contributions; therefore this exploratory study has proved useful for providing an insight into the different types of visitor behaviour characteristics on display when interacting with visitor generated content applications in museum spaces.

The purpose of this section was to explore the kinds of visitor behaviours that occur during a museum visit containing visitor generated content technology. This section described an exploratory

study which investigated current visitor behaviour characteristics and engagement levels in museum spaces by performing a detailed video based study of how visitors approach, examine and interact with visitor generated content technology. It aimed to gain an insight into current visitor behaviour and levels of engagement in order to provide a context for understanding any possible impact of visitor generated content technology on visitor experience. The second aim was to bring to the fore behavioural characteristics in relation to visitor generated content on museum digital devices which may be worth examination in further studies. The analysis revealed the following issues regarding the use of video based observations as a data source to analyse visitor engagement and the impact of digital visitor generated content on museum visitor experience.

Studies of visitor behaviour primarily investigate how people behaviourally and cognitively respond to the design and layout of exhibits. However, they largely ignore the behavioural responses at the "exhibit face" (vom Lehn and Heath 2006) or the "fat moment" (Garfinkel 1967) of visitors' action. This section primarily explored how visitors approach and examine digital visitor generated content applications in museum spaces. Through the analysis of the video based observations from IWM North and the Grant Museum (section 4.6), four categories of engagement with digital visitor generated content have been identified. These include; minimal, cursory, moderate and extensive. These categories highlight the importance of

using pointing gestures and shifts in posture for understanding and sharing content and focussing attention on a particular element of digital visitor generated content or associated museum object. It explores how visitors employ pointing gestures and bodily conduct to align their standpoint to the digital kiosks and their features. Visitors organise their body movement, gestures and social interaction at exhibits to portray and animate specific features for each other. The video based observation proved to be an incredibly useful tool for understanding how visitors approach, examine and engage with digital visitor generated technology.

## 6.7 CONCLUSIONS

This chapter presented a study of visitor contributions from the second iteration of the Social Interpretation application installed in the Imperial War Museum North, Manchester. Data was collected for a period of five months from 16th July to 5th December 2012. This chapter provides data to address the overarching research question focusing on how digital visitor generated content can impact on visitor engagement The analysis revealed the following issues regarding the use of visitor contributions as a data source to analyse visitor engagement and the impact of visitor generated content on museum visitor experience.

A significant proportion (42%) of visitor contributions added to the SI Kiosks in IWM North expressed a direct response to the prompt

question asked about a highlight object - albeit sometimes tangentially. This is a stark difference to IWM London, where the largest proportion of visitor contributions were attributed to the 'noise' category (Figure 25). At IWM North, where these comments seem to reflect a degree of consideration, the visitor has engaged with the object in a different and potentially additional way to other visitors. In some circumstances their responses suggest that such an interaction has increased their sense of engagement and connectedness both to the particular object and to the museum in general. For example, a visitor to IWM North, in response to the question "How would you feel if you had to fire this gun?" placed on a SI kiosk next to the Field Gun, wrote: "I would feel scared because I might shoot my own people" and another visitor wrote: "I was in the 1st regiment rha no.14109585 between 1946 1948 and also in [th]e battery, memories flooding back". These sorts of comments suggest that for some visitors, the invitation to offer their perspective encouraged them to relate to the collection in a personal way. In addition the very fact that visitors can record their perspectives in a form which allows them to express their views in the museum space for other visitors to see is important. The choice of objects at IWM North can also be considered influential in determining the level of SI engagement that may take place. The objects that attracted the highest proportion of 'on topic' responses among their kiosk comments were large objects, physically impressive items within the large Main Exhibition Space, and they can be considered the most controversial objects in comparison to the IWM London SI objects. These qualities

are likely to have encouraged visitors to leave a comment, and this ability for certain objects to generate social interpretation is something that should be noted for future projects wanting to generated visitor responses to objects. From the textual analysis it is possible to suggest that this is in part due to the ability of such objects to engender an emotional response. The fact that this way of enabling social interpretation does allow visitors to respond to, and engage with IWM North's objects on an emotional level, is significant. A substantial number of visitor contributions posted via the SI Kiosks expressed a positive response to the museum and the experience it offers. Although many of these contributions were banal (e.g. "Great museum"; "THE BEST MUESEUM EVER"), some were more considered ("Really brings home the devestation [*sic*] that war and conflict brings", "I love the insight the Imperial War Museum gives you into the war and how hard it must have been."). Although this sort of commentary was not the intended output of the Social Interpretation project, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the museum. Carolyn Royston, head of Digital Media at IWM agrees; "What I have seen is children in particular huddled around the kiosks wanting to interact with them and seeing that level of engagement says to me that this is the future, this is what the museum should be investing in" (Royston 2013 pers. comm. 11th February). These visitor contributions indicate that the SI Kiosks are a major facilitator in engendering

engagement between visitors and the museum. The kiosks engage some visitors, merely by their existence as material objects in the museum space, and then working with the visitor and the museum as a further actor resulting in a response which neither is about the object generally or a response the prompt question positioned on the kiosk screen.

One of IWM's underlying aims of utilising digital visitor generated content, and in this case social interpretation, is to provide visitors with more of a voice, and to enable them to actively participate in the creation of museum content. As we mentioned in chapter 5 by enabling visitors to have a voice there is the potential to challenge the museum's voice of 'authority' and to enable the democratisation of knowledge. Numerous scholars have expanded upon the idea of there being space for visitor dialogue within a museum (Hirzy 1992; Hooper-Greenhill 1999b; Weil 1999; Simon 2010), but the related ideas of authority, authenticity, voice, and the democratisation of culture are still points of conflict in museological debate today (Simon 2010; Crow and Din 2011; Stein 2012). Significantly, social interpretation was not seen to pose a challenge to the voice of the museum due to the quality and type of comments that were left on the comment kiosks, many of which as we have seen in Table 18, were trivial. It seems that the nature of the visitor contributions militated against the construction of a narrative, or set of comments, or even a form of knowledge that might have challenged the voice of the museum. From the data available it is

difficult to report on whether there is a democratisation of knowledge through Social Interpretation because there is very little evidence on if visitors commented, or read the contributions of other visitors. However, a few comments did specifically mention reading other visitors contributions: "These interactive pods are a great experiment - feel like i'm in a conversation about [*sic*] the artefacts and its nice to see other peoples voices - makes the pieces feel more alive, great idea!" However, in the main, reading previous visitor contributions did not appear to motivate other visitors to contribute themselves, nor did it give them access to extra information, or the opportunity to gain new knowledge and understanding with which to challenge the authorised museum text. However, the IWMN SI corpus data (Figure 41) does show some evidence of the potential for this democratisation of knowledge to happen with 42% of the comments in IWM North being categorised as 'on topic'. From this it is can be surmised that for some visitors, having this co-created interpretation would have been a valuable addition to the museum experience. Especially, if the comments were able to add a missing piece of information or an extra detail, and so support the museum's interpretation.

Visitors were evidently willing and open to reading and contributing to other voices in the museum. This finding can be seen as revelatory of a process of democratisation of knowledge. This reconceptualization of openness and authority does not mean that museums need to disregard their inherent purpose as trusted and authoritarian institutions. On the

contrary, it is an opportunity to deepen the museum's purpose in this regard. Digital visitor generated content is a new way to approach the mission of museums, in a way that can integrate their role as keepers of cultural content with their responsibility to facilitate access to content.

Analysis suggests that users are willing to take part in a dialogue, and express their views about their visit and individual object via digital visitor generated content applications. It further suggests that in most cases they can be trusted to do so in a thoughtful, serious fashion. We suggest that one of the main benefits of using open coded analysis as a framework for evaluating digital visitor generated content is the detail that they provide. It is possible to scrutinise individual visitor contributions for elements of visitor engagement, and categorise styles of comments. Visitor comments tend to be an underutilised resource in terms of museum visitor research, often overlooked in favour of other more targeted research methodologies. In the few cases where these types of data have been used they have proven to be fruitful in terms of enhancing our understanding of visitor experiences. The analysis of SI visitor contributions is no exception. This research has shown that utilising open coding analysis to explore visitor generated content is worthwhile resource for capturing the often insightful, emotive responses of museum visitors within the context of the museum environment. MacDonald (2005) believes that these visitor comments serve as "inscriptions of visitor interpretation and thus provide access to aspects of visitor meaning construction" (*ibid.,* p.222). She also notes

that, because they are not shaped by a researcher agenda, they are more likely to elicit unexpected visitor responses. There are drawbacks however. The process of analysing digital visitor generated content data and undertaking open coding is relatively time-consuming and, therefore, resource, is something that needs to be addressed and considered at the outset of any project, as it may require considerable resource (in terms of staff time) for effective management and delivery. Additionally due to the design and privacy concerns of the SI project it was not possible to quantify individual visitor contributions, so it is impossible to comment on whether or not visitors are adding more than one comment to the SI Kiosks.

This research has demonstrated that digital visitor contributions can provide valuable information about visitor use of digital technology in the museum space. In particular the use of open coded content analysis has improved understanding of the contribution patterns and interaction behaviour of IWM North visitors. It is hoped that this data can contribute to further development and refinement of methods to assess the impact and value of digital visitor generated content in museums.

Experiencing museum objects and the digital visitor generated content associated with them is a process that takes place at the confluence of a number of contexts that are constantly negotiated through the visitors themselves. Different levels of engagement can be found at the intersection of all those contexts. Analysing visitor's textual

contributions only provides a glimpse of those contexts while setting aside the possible ways through which visitors infuse their experiences through gestural behaviours inside the museum space. In addition to studying visitor contributions, micro-analysing the physical means through which visitors make and share their experiences contributes to achieving a holistic understanding of the engagement process and realising that there are multiple contexts in which an encounter with a digital visitor generated content application occurs. Utilising both analysis of visitor contributions and micro analysis of video observations provides a valuable guide for further development and combining and refining methods to assess the impact of digital visitor generated content in museums.

# CHAPTER 7: COMPARITIVE STUDY OF IMPERIAL WAR MUSEUM NORTH, IMPERIAL WAR MUSEUM LONDON AND GRANT MUSEUM OF ZOOLOGY VISITOR CONTRIBUTIONS

The studies described in the previous chapters provided an understanding of how digital visitor generated content impacts on visitor engagement in three UK museums. The issues raised about levels of engagement, radical trust and moderation in the previous studies are explored further in the following chapter. In light of the findings from the previous three chapters about engagement and digital visitor generated content applications, this study attempts to provide a closer and deeper analysis of digital visitor generated content in a one month study across all three case studies. This is intended to identify similarities and differences in the degree of visitor generated content and to provide a deeper understanding of how museum visitor engagement can be supported by digital visitor generated content.

This chapter presents and discusses the results from all three of the case studies of visitor generated content in museums where data was collected by archiving visitor contributions. Data across all of the case studies has been analysed in order to identify similarities and differences in the degree of visitor generated content. By identifying similarities and differences, further insight into how museum visitor

engagement can be supported by visitor generated content is provided. By comparing studies, it is possible to examine the findings of one study in light of another. These comparisons can reveal the otherwise hidden contextual differences that are fundamental to interpretation of the studies (Woods 1992). Miles and Huberman (Miles and Huberman 1994) suggested specific ways in which researchers might make sense of data pertaining to multiple cases; they provided extensive description of cross-site analysis through the use of matrices[140]. Such descriptions, however, have been criticized for their focus on the mechanics of analysis at the expense of attention to the interpretation achieved by synthesis across studies (Olmsted et al. 1989). Therefore for the purpose of this section, rather than focusing on the mechanics of analysis, full attention will be paid to the interpretation of the cross case study synthesis. The chapter is divided into five sections. The first section provides a brief introduction to the setting of the research and section two provides a description of the digital visitor generated content applications. Section three discusses the data collection and analysis methods used. The fourth section presents the data analysis and results of the comparative study. The final section discusses the findings.

[140] "A matrix is essentially the crossing of two lists, set up as rows and columns"(Miles and Huberman 1994, p.3).

## 7.1 RESEARCH SETTING

This chapter presents and discusses the results of the cross case assessment by comparing one month of data from all three of the case studies. This study was conducted for a one month period, between 1st and 31st October 2012, and involved the Grant Museum of Zoology, Imperial War Museum North and Imperial War Museum London. October 2012 was selected for the study due to the high peak of comments in Imperial War Museum London and Imperial War Museum North.

For details of the setting, description and prompt questions for Social Interpretation please see chapter 5 for Imperial War Museum London and chapter 6 for Imperial War Museum North.

The main component of QRator is a custom bespoke application that is built for Apple's iOS platform running on ten iPads within the UCL Grant Museum. Each of the ten iPad's contained one of ten QRator questions.

In order to keep the displays in the Grant Museum current, the decision was taken by the Museum Manager and curator to change the QRator questions on a regular basis[141]. In comparison to Chapter 4 (Table 7) each of the ten QRator iPad's contained one of ten different QRator questions (Table 26). The questions were created by museum staff and were designed so that contributing a response does not require any

[141] It was originally thought that the QRator questions would be changed on a bi-monthly basis. The response to the initial QRator questions proved to be sustainable however, so to date the questions have only been change once.

prior knowledge. "The questions we ask are mostly very open …they all deal with issues that we deal with everyday surrounding the ethics of collections like ours, or some big questions in natural history and other life sciences that relate to our collections" (Ashby 2012 pers. comm. 2nd March).

| **Headline** | **Question** | **Explanation** |
|---|---|---|
| ***Accuracy or information?*** | Can we lie about what a specimen is or where it came from? | Would it make a difference to you if we deliberately mis-labelled a specimen? If we wrote interesting factual labels about common seals, but used a grey seal skull in the display, would you care if you found out? The facts would still be true. What if we said the specimen was from Britain when the specimen actually came from Denmark? |
| ***Cutting class*** | Do you think people today should perform dissection as part of their learning? | Dissection can inspire awe in nature and encourages more students to become biologists. Is the use of animals or animal organs justifiable in the name of learning? Often organs come from butchers, but is it acceptable if |

| | | |
|---|---|---|
| | | whole animals are used? Dissection is used as an essential aid in directed research, but what about in students' learning? Can models and computer simulations adequately replace real-life experience? |
| ***Climate casualties?*** | Given that climate change is man-made, should we be protecting animals that are at risk from its effects? | How do we protect species in a habitat that is no longer suited to them? When climate change destroys habitats – melting ice and forming deserts, where will their animals go? Is there any point in protecting these animals if eventual failure is likely? Or do we have a responsibility to protect animals under threat from human activities? |
| ***Conserving cures?*** | Should we only be conserving things that have a potential human benefit? | Arguments to conserve ecosystems, particularly rainforests, often include the possibility of finding plant- or animal-based drugs which may add to the human medicine |

| | | |
|---|---|---|
| | | cabinet. Should such considerations be taken into account when deciding what to conserve? Does it matter if a species with no benefit to man goes extinct? How do we decide what to protect? |
| ***Gone for Good?*** | Should we clone extinct animals? | The technology may soon exist to clone recently extinct animals using DNA from museum specimens, but usable and complete DNA sequences are hard to find. Should we try and bring back animals that humans have driven to extinction? What would you do with a handful of cloned individuals? Would the money be better spent on animals we still have? |
| ***Ecology or Exploitation?*** | Is ecotourism an answer to local environmental and biodiversity conservation? | Tourism can bring money into local communities, giving them financial incentives to value and protect their wildlife. Should tourism be banned when the |

| | | |
|---|---|---|
| | | damage done to an ecosystem by large numbers of visitors reaches a certain point? Is it exploitative to build businesses around access to wild animals? How do we balance the protection and visibility tourism offers an animal against the potential damage? |
| ***Necessary or unnatural?*** | Is domestication ethical? | Much of human society involves domesticated animals, from food and transport to pets and clothes. Is it wrong to breed individuals together to select for desirable traits? Should we be interfering in evolution? Does it matter what the reason is? Many domesticated animals are now unable to survive without human intervention. If domestication is unnatural, is it wrong? |
| ***Really rare?*** | Should British red squirrels be protected when they are common | There is a limited amount of money available for conservation. Not everything can be protected. How important is it if an animal |

| | | |
|---|---|---|
| | in Europe? | goes extinct in one country if they still exist elsewhere? Some species, like red squirrels are common in Europe but declining in the UK – should they be protected here? Do local extinctions affect global biodiversity? |
| ***Touching?*** | Is it irresponsible for museums to allow object handling? | Museums have a responsibility to protect their collections for the future. Specimens which are handled suffer wear and tear and risk major damage if they are dropped. But handling an object is a much richer experience than just seeing it. Our collection is handled constantly by university students, schools and the public. Is object handling worth risking the damage? |
| ***Under the skin*** | Do you find skeletons, taxidermy or specimens in | When we design our displays, we have to decide what type of specimen should tell the story we want to tell. Should it be a |

| | | |
|---|---|---|
| | fluid more interesting? | skeleton, a taxidermy mount, or something preserved in a jar? How does your interest differ between them? Does each option mean something different to you? |

Table 26: Question content on Grant Museum QRator iPads between 1st and 31st October 2012.

## 7.3 DATA COLLECTION AND ANALYSIS METHODS

Data from the three case studies was collected by archiving contributions from the four Social Interpretation Kiosks, six Social Interpretation tablets and ten QRator iPads from 1st to 31st October 2012. Each individual visitor contribution to IWM North and IWM London was simultaneously uploaded to the IWM CIIM master database, followed by the IWM website pulling the data about each SI prompt question from the master database and integrating the contributions within IWM Collection Search online. Each individual visitor contribution to QRator at the Grant Museum was simultaneously uploaded to the 'ToTeM' master database on the Tales of Things website[142], followed by the QRator website pulling the data about each QRator question from the master database and integrates these comments within QRator online. These comments were then aggregated together based on the location, device and object in the museum. Using the custom built module for the IWM CIIM for moderation purposes by Knowledge Integration and the custom built Wordpress module for QRator the data was collected from the public API's and outputted as a CSV (comma separated values) file which was then imported into both Excel and Nvivo statistical analysis packages for further analysis. This resulted in a combined corpus of 8445 visitor contributions from all three museums, with a total of 36965 words

[142] http://www.talesofthings.com for more information on Tales of Things see Appendix 1.

containing 6344 unique words, providing a rich dataset for the analysis of visitor engagement.

In the same way as in Chapters 4-6 the visitor contributions were categorized qualitatively using open coded content analysis where each comment was read and categorized. The visitor contributions were read sentence-by-sentence and coded in accordance with the 'open coding' and 'axial coding' elements of Grounded Theory in order to identify recurring behaviours and how they might relate to one another. For literature underpinning this method, see section 3.3.

As it can be seen in Chapters 4-6 visitor contributions were initially divided into three broad overarching categories of 'on topic' where the contribution content focused on the current question or topic, 'about the museum', where the visitor contribution focused on opinions of the museum as a whole, or 'noise', comments deemed to be spam or inappropriate. These categories subsume many of the behavioural characteristics that have been identified in the study. Despite the apparently simplistic categorisation it has been possible to discover patterns of use and begin to understand how visitors are relating to and interpreting the exhibitions, and making meaning from their experience.

Then through the cyclic process of re-reading the data, the three basic categories were split into 12 further codes (Table 27). This re-coding provided more detailed understanding of how visitors were interacting

with the visitor generated content applications[143]. It is important to point out that there is a high degree of variability in the nature of contributions made within the 'on topic' and 'about the museum' categories. It was important to be inclusive and non-judgemental when categorising visitor contributions in order to take into account the full range of visitor generated interpretations of the museum objects and their individual museum experience.

| Category | Sub Category | Description |
|---|---|---|
| **On Topic** | Answer to prompt Question | Seemingly direct answer to the question on QRator iPad or Social Interpretation kiosk. |
| | Focus on Object | Comment about the object and/or case attached to QRator iPad or Social Interpretation kiosk. Visitors are engaged in their own museum interpretation. |
| **About the Museum** | Positive Opinion about Museum | Positive Comment about the museum or exhibition experience. |
| | Negative Opinion about Museum | Negative comment about the museum of exhibition experience. |
| | Focus on Gallery Theme | Comment about the themes explored in the gallery. |
| | Focus on Specific object elsewhere in the museum | Comment about an object or idea from elsewhere in the museum. Not associated with object and/or case attached to QRator iPad or Social |

[143] The re-coding has not been undertaken in Chapters 4-6 due to the sheer number of visitor contributions and time constraints placed on this thesis.

| | | |
|---|---|---|
| | | Interpretation kiosk. |
| | Focus on Group of objects elsewhere in the museum | Comment about a groups of objects or ideas from elsewhere in the museum. Not associated with object and/or case attached to QRator iPad or Social Interpretation kiosk. |
| | Overall Experience | Comment about the overall museum experience. |
| | Question | Comment asking the museum or other visitor a question. |
| | Request | Comment requesting information from the museum. |
| **Noise** | Name only | No comment made just name entered. |
| | Spam | Spam and trolling comments. |

Table 27: Re-coded Visitor Contribution Categories

For the purpose of this study, a series of textual and content analyses of visitor contributions were undertaken. Various quantitative measures were used such as analysing the frequency of comments according to date and time, comparing comment rate between the three case study museums and suitable text analysis tools were used to interrogate the corpus. In addition, Sentiment analysis was undertaken on the corpus.

## 7.4 ANALYSIS OF DATA

This section examines the three case studies, QRator at the Grant Museum, Social Interpretation at IWM North and Social Interpretation at IWM London. In order to fully understand each data set before comparisons can be made, it was important to analyse each case study data set individually. QRator in the Grant Museum received 382 visitor contributions in the one month period of October 2012. The largest proportion of the comments in the QRator Grant Museum corpus fell into two main categories (Figure 48); 'about the museum' (46%) and the category of 'on topic' (45%); triggered predominately by the QRator interface and questions posed by the museum curators, suggesting that visitors are inspired to share their own experiences, thus co-constructing a public multiple interpretation of museum objects. Interestingly, many of the visitor comments focused on opinions of the museum as a whole (46%). Again this supports the idea that digital visitor generated content used in this way does promote of an opportunity for visitors to make meaning from their whole experience. In the same way as demonstrated in Chapter 4 the data from October 2012 visitor contributions, QRator shows a very low level of 'noise' category contributions, highlighting a lack of spam and inappropriate commenting (9%). The QRator data suggests that 'radical trust' in visitors does indeed work: spamming and inappropriate commenting does not appear to have happened to a significant extent in the Grant

Museum at all. The high proportion of 'on topic' and 'about the museum' visitor contributions and lack of inappropriate commenting is significant, not only because it indicates that visitors are using the iPads, without instruction, to make comments about the museum in general, pointing out what they enjoyed about their visit or making other useful contributions. QRator is providing an opportunity for visitors to make meaning from their whole museum experience, as well as engage with the exhibit-specific content and interpret the exhibitions themselves. Many of the visitor contributions refer to specimens that visitors have seen and want to reference often stating what they have learnt or remark about something surprising they have seen. Visitors point each other to objects without the interference of museum staff they choose in a very democratic way what they think should be highlighted. Both of these comment types provide evidence that the interpretive aims of the Grant Museum are being met. The Grant Museum Interpretation Strategy (Ashby 2005, 1-2) lists the interpretation aims as (in no order of priority) follows (Table 28):

| | **Grant Museum Interpretation Aims** |
|---|---|
| **1.** | to increase people's knowledge and understanding of the natural history of the collection and its animals by providing factual information about the collection and the topics it relates to; |

| | |
|---|---|
| **2.** | to lead people to gain an increased appreciation for the natural world independent of factual information; |
| **3.** | that people enjoy what they see and do, and explore the depths of the collection |

Table 28: Aims from the Grant Museum Interpretation Strategy (Ashby 2005, 1-2)

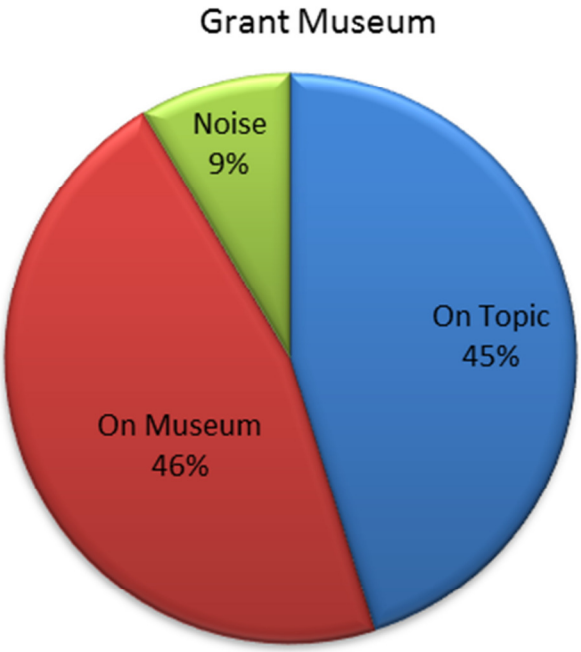



Figure 48: Percentage of visitor contribution by category, Grant Museum October 2012. The majority of the comments in the corpus fell into comments 'about the museum' and comments 'on topic'.

IWM North received a total of 3566 visitor contributions in October 2012. The largest proportion of the visitor contributions from the IWM North fell into one main category (Figure 49); 'on topic' (44%); triggered predominately by the Social Interpretation interface and the

provocative questions posed by the museum staff. 'on topic' visitor contributions were seemingly direct responses to the question asked by the Social Interpretation kiosk or a direct response to the object of focus in the SI interpretation. 'On topic' contributions highlight that visitors have not only read, understood and interacted with the SI kiosk, but have also viewed or studied the museum object and are compelled to participate in creating their own museum interpretation and experience. Many of the visitor contributions focused on opinions of the museum as a whole (28%) mainly expressing a positive response to the museum and the experience it offers. Although many of these contributions were banal (e.g. "nice museum"; "amazing"), these short evaluative statements are a significant form of visitor contribution. Although this sort of commentary was not the intended output of the Social Interpretation project, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the museum. The noise category, for the purpose of this study, reflects visitor contributions which are seemingly spam and trolling comments (28%). IWM North received a total of 28832 visitors to the museum in October 2012 (DCMS 2014). When comparing the total number of visitor contributions against total number of visitors to the IWM North in October 2012 it is possible to see that, assuming visitors make no more than one contribution per visit, 12.36% of visitors make a contribution to the SI kiosks.

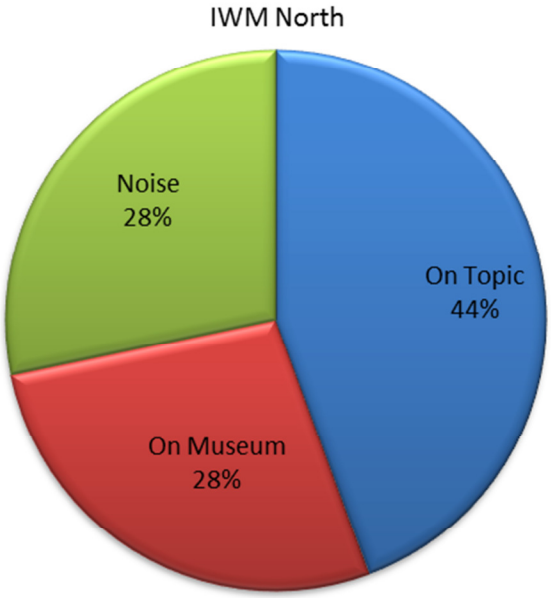



Figure 49: Percentage of visitor contribution by category, IWM North October 2012. The majority of the comments in the corpus fell into comments 'on topic'.

IWM London received 4497 visitor contributions in the one month period. The visitor contributions from IWM London, the largest proportion of visitor contributions in the corpus fell into one main category (Figure 50); noise (48%). Whilst a certain level of meaningless interaction is always expected in applications harnessing user generated content; due to the nature of open participation which increases the incidence of "spamming" and "trolling" by misanthropic users. The actual volume of spamming, trolling, and unhelpful commentary is much higher than expected for a one month data set, particularly compared with an experience with the Grant Museum. Certainly, the volume of inane and banal comments is likely to have

caused many visitors to avoid reading further comments or to leave their own. The 2286 noise contributions are almost certainly caused primarily by the number of children and school groups who interacted with the kiosks. Many of the visitor contributions focused on opinions of the museum as a whole (33%) mainly expressing a positive response to the museum and the experience it offers. This is similar to the proportion of 'about the museum' contributions at IWM North. Although this sort of commentary was not the intended output of the Social Interpretation project, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases the 'about the museum' category contributions seem to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the experience they are having within the museum. The smallest proportion of the visitor contributions from the IWM London fell into the 'on topic' (19%) category. 'On topic' visitor contributions were seemingly direct responses to the question asked by the Social Interpretation kiosk or a direct response to the object of focus in the SI interpretation. The low proportion does support the notion that the high volume of noise contributions is likely to have caused many visitors to avoid reading further comments or to leave their own on topic response. IWM London received a total of 85458 visitors to the museum in October 2012 (DCMS 2014). When comparing the total number of visitor contributions against total number of visitors to the IWM London in October 2012 it is possible to see that, assuming

visitors make no more than one contribution per visit, 5% of visitors make a contribution to the SI kiosks.

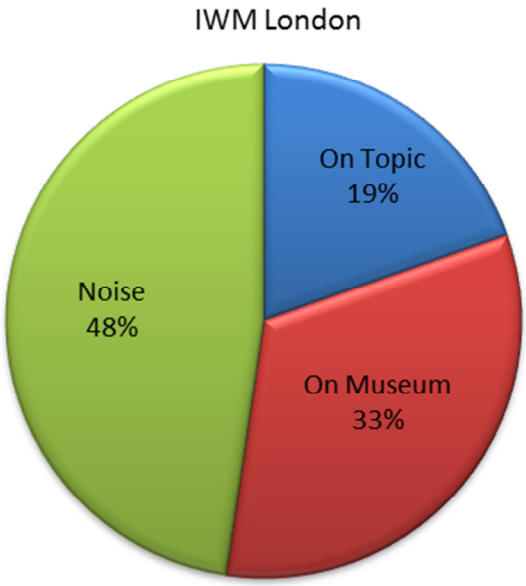



Figure 50: Percentage of visitor contribution by category, IWM London. The majority of the contributions in the corpus fell into the 'noise' category.

An examination of the basic categories of visitor contributions of the three case studies (Figure 51) shows that IWM London received the largest percentage of noise category contributions with 48%, compared to the 28% at IWM North and much smaller 9% at the Grant Museum. The level of noise contributions is likely to correspond to the number of visitors to the museums. IWM London has over double the amount of visitors than IWM North during the study period. The visitor contributions from the Imperial War Museum North indicate that whilst there is an increase in noise contributions (28%) compared to the Grant Museum the percentage of 'on topic' contributions remains high with

44%. IWM London in comparison has a much lower percentage of 'on topic' contributions with 19%.

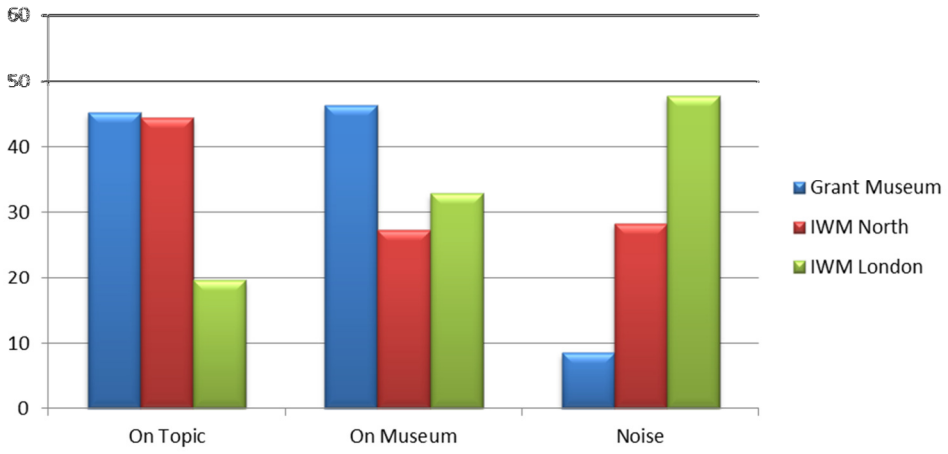



Figure 51: Percentage of visitor contributions for all three case studies

When comparing the individual QRator questions and Social Interpretation prompts, it can be seen that certain questions gained more 'on topic' visitor contributions than others (Figures 52-54). The Gone for Good QRator question at the Grant Museum (Figure 52) received the most contributions by visitors which focused on the topic raised by the museum (54 contributions), followed by Under the Skin (26 contributions) and Cutting Class (20 contributions) the Accuracy or Information QRator question received the least number of 'on topic' contributions (3 responses). At IWM North (Figure 53) the T-34Tanks and the Baghdad Car received the most 'on topic' visitor contributions with 519 and 516 contributions in the one month period. The Field Gun received the least with 203 contributions. Conversely the Field Gun received considerably less noise contributions in the same period (174

contributions) compared to the other three IWM North SI Kiosks. At IWM London (Figure 54) the Squander Bug SI tablet received the highest number of 'on topic' visitor contributions (252 responses) closely followed by the Anti-Gas Mask (228) and Evacuee Label (208). The Fish Shop and Make Do and Mend SI tablet receive a similar number of contributions with 97 and 95 and the VE Day SI tablet received the lowest amount of 'on topic' responses with 60 contributions. This disparity in frequency of 'on topic' contributions is likely to be because the SI kiosks with prompt questions which posed more direct, emotive questions, were easier to directly associate with visitors' previous experience and own perspectives, provoking a higher frequency of posts.

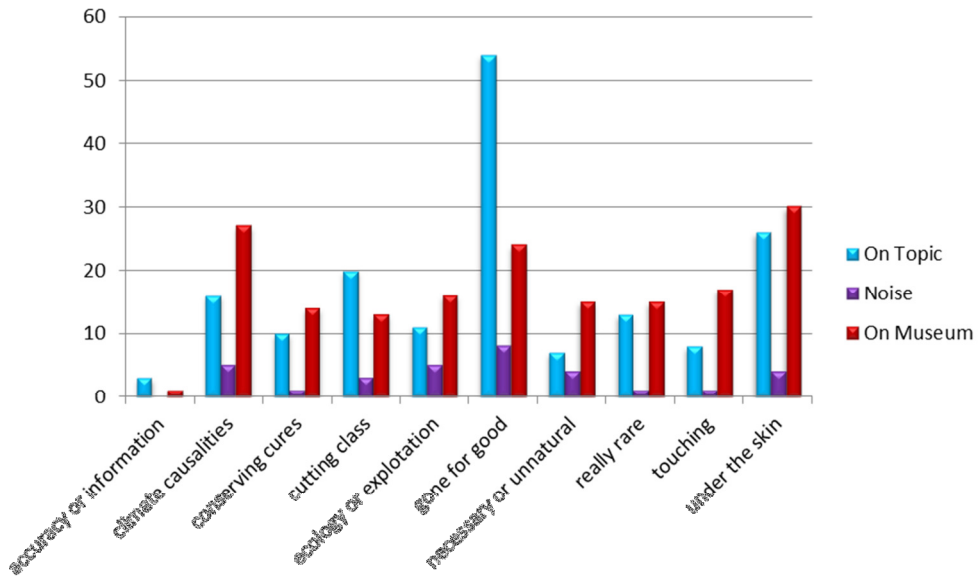



Figure 52: Category breakdowns from each of the ten QRator iPads in the Grant Museum October 2012

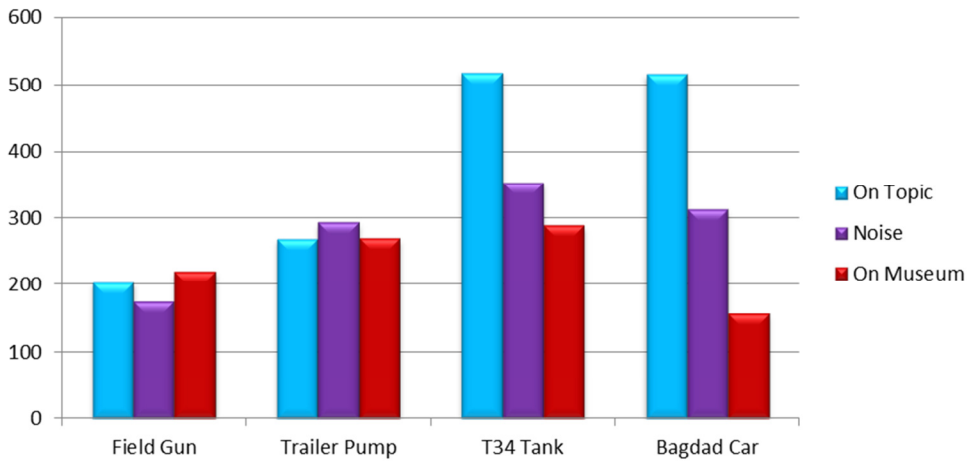



Figure 53: Category breakdowns from each of the four Social Interpretation kiosks in IWM North October 2012

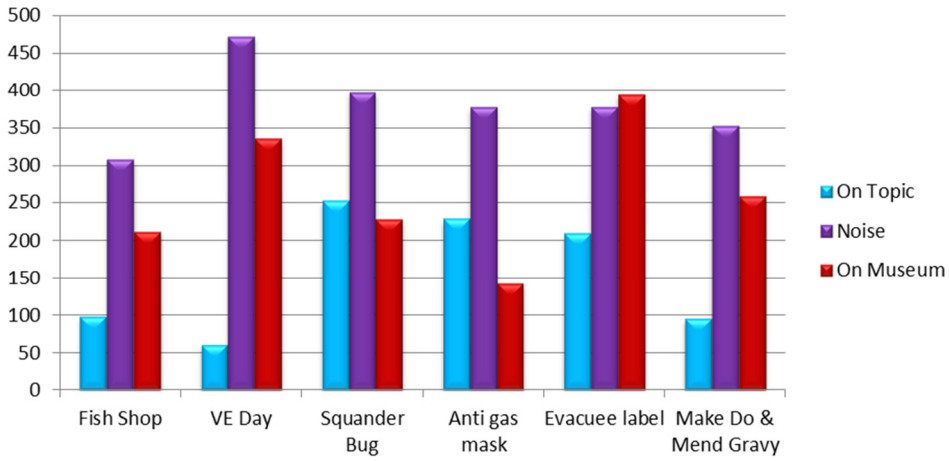



Figure 54: Category breakdowns from each of the six Social Interpretation tablets in IWM London October 2012

In order to gain further insight into the impact of digital visitor generated content on the visitor experience, it was felt necessary to re-code the visitor contributions. Through the cyclic process of re-reading the data, the basic categories were split into 12 further codes (Figure 55). This re-coding provided more detailed understanding of how

visitors were engaging with the visitor generated content applications. When re-reading the visitor contribution data it was possible to refine the three overarching categories by splitting the codes into a range of more detailed categories which provided further insight into how visitors were choosing to respond to the museum objects and prompt questions. The 'on topic' category was split into two distinct type of visitor contribution; responses which are seemingly a direct answer to the prompt question on the QRator iPad or Social Interpretation kiosk and responses which focus on the object with comments focused on the highlight objects highlighting that visitors are engaged in their own interpretation. The Grant Museum has the largest percentage of visitor contributions which directly answer the prompt question with 40.5% compared to IWM North's 18.6% and IWM London's low percentage of 8.6%. The Grant Museum has a considerably lower percentage of visitor contributions when looking at the responses which focus on the object with 3.4%. This is likely to be due to the Grant Museum having the QRator iPads against a case of objects rather than a single highlight object suggesting that it is more difficult for visitors to focus on specific objects when there are a range to choose from. The 'about the museum' category has been split into seven sub categories, ranging from positive and negative responses about the museum or exhibition to questions and requests asked by the visitors. All three case studies had similar percentages in the positive opinion category; the Grant Museum with 26.4%, IWM North with 23.6% and IWM London with 19.3%. The remaining museum sub categories are relatively low bar the Grant

Museum's visitor response focusing on a specific object elsewhere in the museum with 12.8%, where visitors are choosing to highlight key specimens within the museum space for other visitors to find. The Noise category has been re-coded into two sub categories; Spam which contains spam and trolling comments and Name Only which contains visitor contributions where a name was entered and no other comments were made. Both IWM North and IWM London have high percentages of spam with 30.9% and 24.6%. IWM London also has a high percentage of name only contributions with 35.8%.

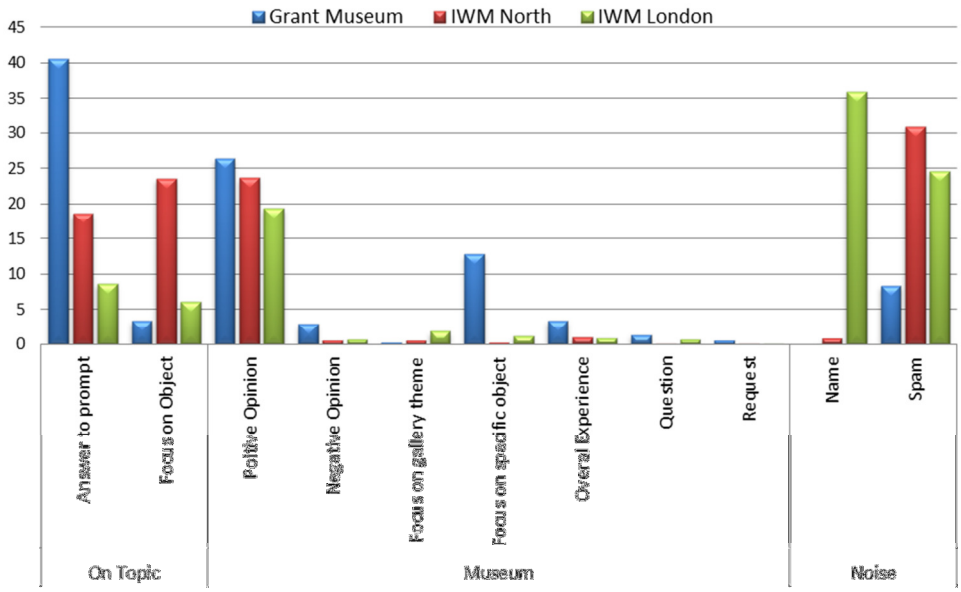



Figure 55: Visitor contributions for October 2012 re-coded into sub categories

When focusing on the individual case studies and the sub categories some interesting results can be seen (Figures 53-55). The data from the Grant Museum (Figure 56) shows that the majority of visitor contributions seemingly answer the prompt question (155

contributions) followed by contributions which are positive about the museum experience (101 contributions) and visitor responses that focus on a specific object elsewhere in the museum (49 contributions). When focusing down onto the individual QRator iPads (Table 29) it can be seen that the Gone for Good QRator question is the main contributor to the answer to prompt category with 50 responses. This can be compared with the positive opinion visitor contributions are more equally spread between the ten QRator questions.

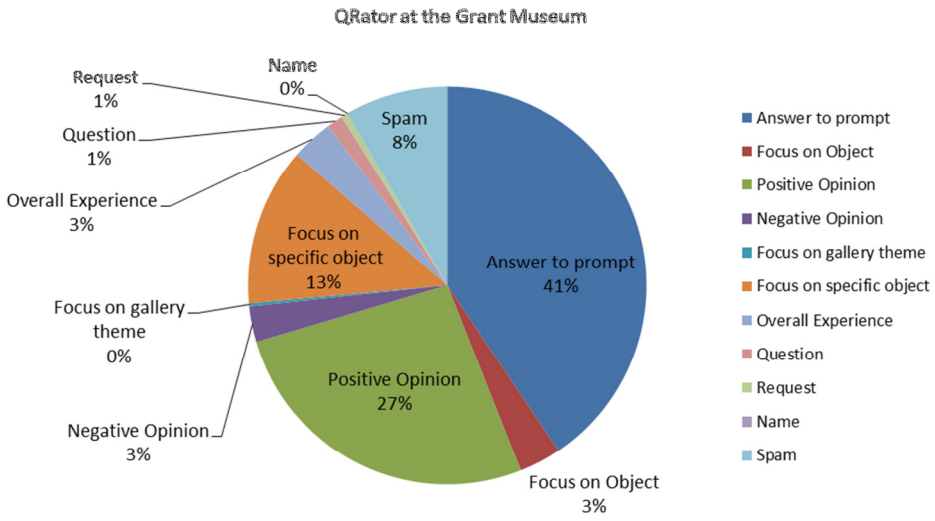



Figure 56: Visitor Contributions for October 2012 at the Grant Museum split into sub categories

| Object | On Topic | | Museum | | | | | | | Noise | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Answer to prompt | Focus on Object | Positive Opinion | Negative Opinion | Focus on gallery theme | Focus on specific object | Overall Experience | Question | Request | Name | Spam |
| accuracy or information | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| climate causalities | 14 | 2 | 16 | 2 | 0 | 7 | 1 | 1 | 0 | 0 | 5 |
| conserving cures | 8 | 2 | 8 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 1 |
| cutting class | 20 | 0 | 9 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 3 |
| ecology or exploitation | 11 | 0 | 9 | 1 | 0 | 5 | 1 | 0 | 0 | 0 | 5 |
| gone for good | 50 | 4 | 17 | 3 | 0 | 3 | 0 | 0 | 1 | 0 | 8 |
| necessary or unnatural | 7 | 0 | 6 | 1 | 1 | 7 | 0 | 0 | 0 | 0 | 4 |
| really rare | 12 | 1 | 9 | 1 | 0 | 7 | 5 | 3 | 0 | 0 | 1 |
| touching | 8 | 0 | 8 | 3 | 0 | 3 | 3 | 0 | 0 | 0 | 1 |
| under the skin | 22 | 4 | 18 | 0 | 0 | 9 | 1 | 1 | 1 | 0 | 4 |

Table 29: October 2012 sub-categories for all the QRator Questions. We can see that the Gone for Good QRator question received the largest proportion of visitor contributions coded as an Answer to the Prompt category.

Moving on to IWM North, the data (Figure 57) shows that the amount of visitor contributions which focus on the SI object and the amount of visitor contributions which contain a positive opinion about the museum are very close in number (841 and 845 contributions). Spam commenting was high with 1102 contributions and the visitor

responses directly answering the prompt question have a significant number of responses with 665 contributions. When focusing down on to the individual SI kiosks (Table 30) it can be seen that the Baghdad Car has the highest number of contributions which answer the prompt questions (306) whereas the T-34Tank has the highest number of visitor responses which focus on the SI object (371). The Trailer Pump and the T-34Tank received the highest number of positive opinion contributions (251 and 267).

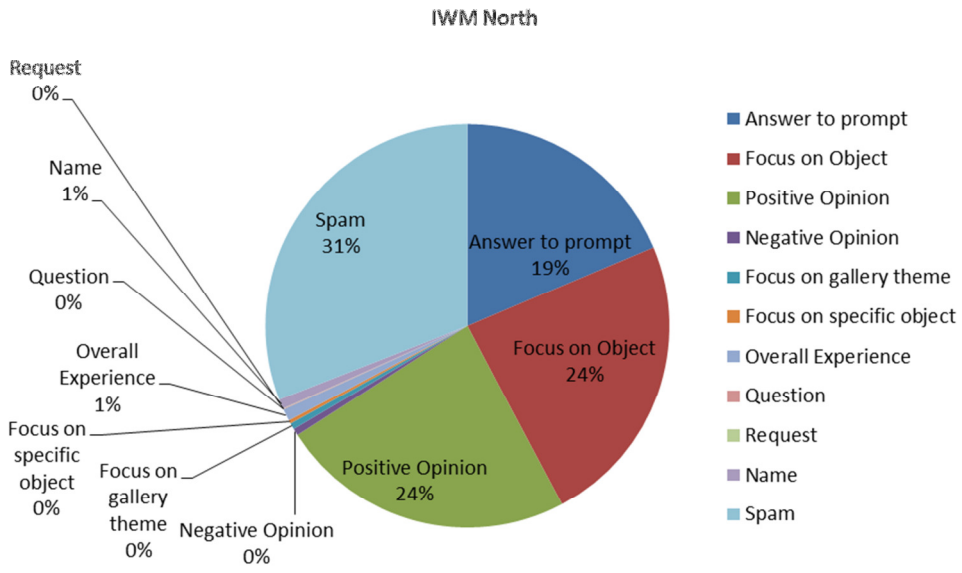



Figure 57: Visitor contributions for October 2012 at IWM North split into sub categories

| Object | On Topic | | Museum | | | | | | | Noise | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Answer to prompt | Focus on Object | Positive Opinion | Negative Opinion | Focus on gallery theme | Focus on specific object | Overall Experience | Question | Request | Name | Spam |
| Field Gun | 73 | 130 | 184 | 5 | 8 | 6 | 16 | 0 | 0 | 4 | 170 |
| Trailer Pump | 138 | 130 | 251 | 3 | 7 | 1 | 4 | 1 | 1 | 11 | 281 |
| T-34Tank | 148 | 371 | 267 | 3 | 2 | 1 | 13 | 1 | 0 | 10 | 342 |
| Baghdad Car | 306 | 210 | 143 | 9 | 1 | 2 | 1 | 0 | 0 | 3 | 309 |

Table 30: October 2012 sub-categories for all the IWM North Social Interpretation Kiosks. We can see that the T-34 tank has the highest number of contributions in the 'focus on object' category and the Baghdad car received the highest number of 'answer to prompt' visitor contributions.

The IWM London data (Figure 58 and Table 31) indicates that a large proportion of visitor contributions are Name only contributions (2286). This was followed by 1571 contributions categorised as spam. These noise sub categories make up the majority of visitor responses in October 2012. Whilst a certain level of meaningless interaction was expected, the actual volume for a one month period was much higher than expected at both IWM institutions, particularly in comparison to the Grant Museum.

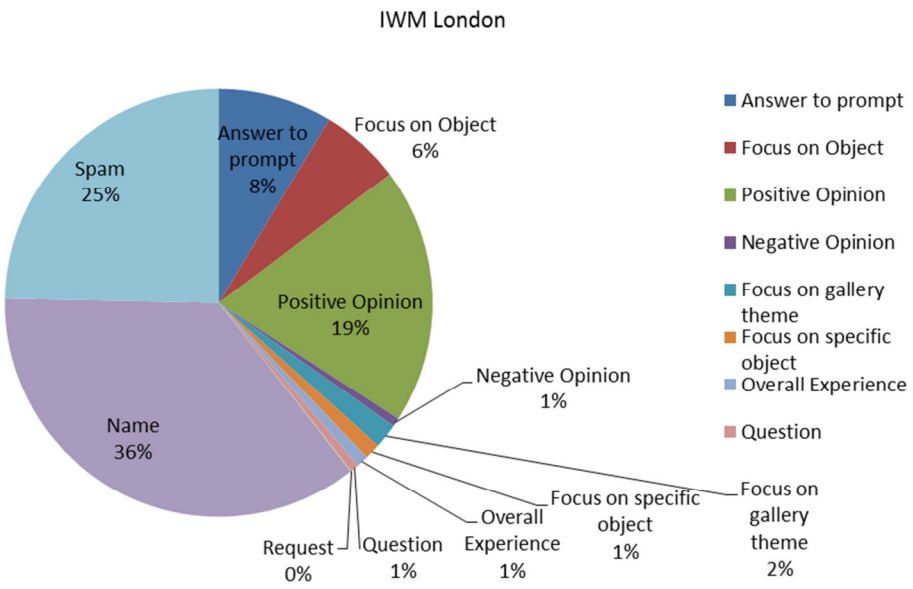



Figure 58: Visitor contributions for October 2012 at IWM London split into sub categories

| Object | On Topic | | Museum | | | | | | | Noise | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Answer to prompt | Focus on Object | Positive Opinion | Negative Opinion | Focus on gallery theme | Focus on specific object | Overall Experience | Question | Request | Name | Spam |
| Fish Shop | 72 | 25 | 152 | 6 | 31 | 14 | 5 | 3 | 0 | 308 | 211 |
| VE Day | 40 | 20 | 265 | 8 | 24 | 13 | 13 | 10 | 3 | 472 | 336 |
| Squander Bug | 114 | 138 | 175 | 8 | 24 | 13 | 3 | 5 | 0 | 397 | 228 |
| Anti gas mask | 131 | 97 | 121 | 2 | 7 | 8 | 2 | 2 | 0 | 378 | 142 |
| Evacuee label | 157 | 51 | 310 | 11 | 23 | 17 | 18 | 16 | 0 | 378 | 395 |
| Make Do & Mend Gravy | 36 | 59 | 211 | 6 | 9 | 11 | 16 | 5 | 1 | 353 | 259 |

Table 31: October 2012 sub-categories for all the IWM London Social Interpretation Tablets. The table highlights the large amounts of spam and name only visitor contributions.

Consideration should be given for future projects utilising digital visitor generated content to introduce a post moderation system that would help to filter out more of that type of spam comment. The Grant Museum made post moderation an integral part of their front of house staff role:

> On your average day, it probably takes 10 minutes a day to maintain and post-moderate visitor comments. It is another aspect of Front of House, it is something that wasn't on our task list previously, but the team here know that they all have a public remit, QRator is a fairly natural extension of the work that they do, and they care about what visitors say and it is important that they can respond to visitors (Ashby 2013 pers. comm. 25th November).

In comparison, IWM did not have adequate resource to post-moderate on a daily basis:

> The key lesson learned from the SI project is that we need to better plan and integrate projects involving visitor-generated content into a wider programme. These projects extend beyond the Digital Media department and require buy-in, resource and time from other areas of the public programme such as marketing, visitor services, curators/historians, exhibitions etc… We also need to look at developing a suitable workflow to manage VGC and to be clear about what our aims and goals are

when asking the public to participate in this way (Royston pers. comm., 15th December 2013).

Certainly, the volume of inane and banal contributions was one of the more negative features of the SI technology in both IWM institutions and a more comprehensive moderation workflow would have been useful. Despite the high number of noise contributions there is still a significant amount of visitor contributions which make positive reflections about the museum experience (1234 contributions). When looking at the individual SI tablets (Table 31) it can be seen that the largest proportion of positive opinion visitor contributions came from the Evacuee Label SI tablet (310 contributions), followed by the VE Day SI tablet which received 265 contributions.

In terms of actual visitor contribution practice, Figure 59 displays commenting levels in total for the visitor contributions which can then be compared to the category group of 'on topic' at all three of the case studies (Figure 60). From this it can be seen that all three case studies show similar spikes in visitor contribution activity. All case studies see a slight spike on the 6th October 2012, and a larger spike on the 29th October. IWM North and IWM London follow similar peaks and troughs throughout the month, whereas the Grant museum is relatively steady in comparison. On the 20th October IWM North displays a dip in visitor contributions (39) but IWM London and the Grant Museum see a rise with 117 and 38 contributions. This corresponds with a Saturday opening. IWM London displays a high spike on the 18th with 285

contributions, IWM North also has a similar rise with 133 contributions whereas the Grant Museum remains steady with contributions in single figures. When looking at the incidence of 'on topic' visitor contributions (Figure 60), all three case studies show spikes in 'on topic' visitor activity on the 6th, 13th, 15th and 29th October 2012. In the 8th October IWM North dips significantly to 12 'on topic' visitor contributions compared to IWM London's 20. There is also an interest overlap on the 20th October, IWM North 'on topic' contributions drops to 12, the Grant Museum rises to 18 and IWM London has 23 'on topic' contributions. Indicating that nearly half of the Grant Museum's contributions on the 20th were 'on topic' focused on the QRator question asked by the museum. On the 30th October IWM North highlights that half of the visitor responses left at this date were 'on topic', compared to just over 30% of the Grant Museum and IWM London's 'on topic' responses.

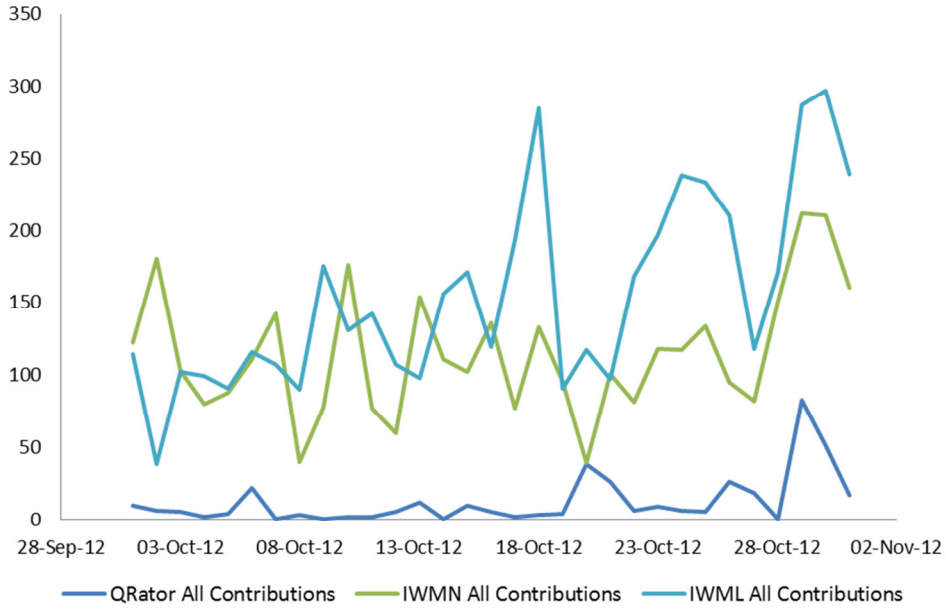



Figure 59: Total number of visitor contributions in October 2012 by date

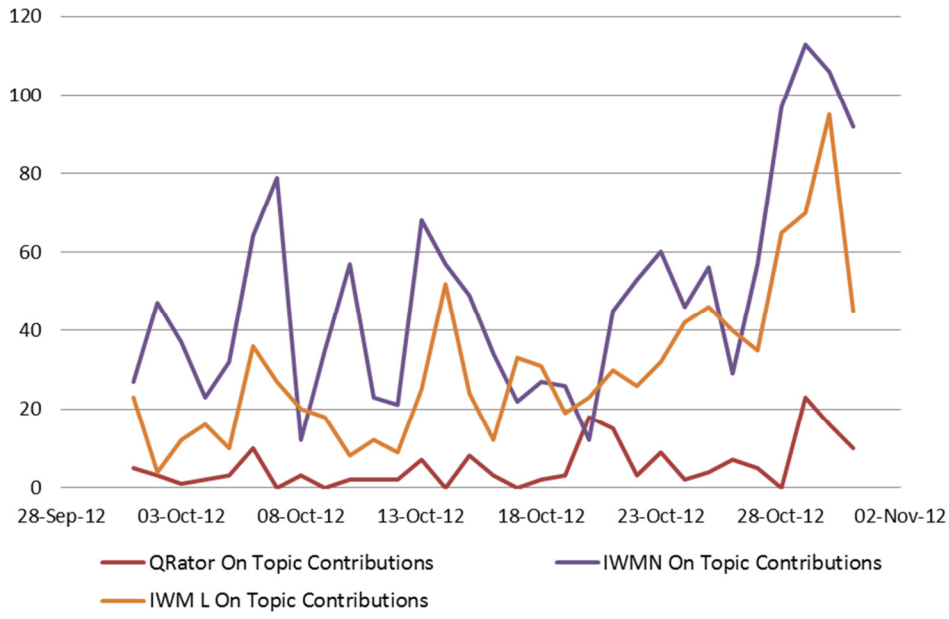



Figure 60: Total number of 'on topic' visitor contributions in October 2012 by date

In the same way as previous chapters, text analysis tools were also used to interrogate the corpus of visitor contributions. The October 2012 data for each case study was run through the text analysis tool Voyant, to highlight the commonly used words in the visitor contributions, and to enable a Sentiment Analysis to take place. The table below highlights (Table 32) the most commonly used words in the October 2012 contributions corpus from the 1st October to the 31st October 2012. Words are shown in exact frequencies, excluding words like 'the' and 'a' (using the Taporware English Stop Words List [144]). When combining the case study corpus' together, 'cool' is by far the most commonly used word, with a frequency of 567 in a one month period across three museums. However the high frequencies of 'cool' do come from IWM

[144] http://taporware.ualberta.ca/~taporware/cgi-bin/prototype/glasgowstoplist.txt

North and London. Other key words demonstrate that visitors appear to be positively engaged in the museum experience; 'like' and 'good' feature highly in the corpus with a count of 410 and 331 which are all positive sentiments expressed by visitors, highlighting the positive experience they are having in response to the museum.

Both IWM North and The Grant Museum have higher frequencies of words relating to museum objects and the prompt questions: animals (54), yes (24), fluid (15), species (14), extinct (13), specimens (12), tank (125), run (114), scared (109) and car (90). However, this can be compared to IWM London which has much higher frequencies of adjectives about museum experience. If the nature of the repeated contributions are considered, it does reinforce the museum perspective that the majority of existing comments on the screens were banal and repetitive, potentially providing little incentive to other visitors to read them or spend time formulating individual views relating to the prompt question.

| Total | Count | QRator | Count | IWM North | Count | IWM London | Count |
|---|---|---|---|---|---|---|---|
| cool | 567 | animals | 54 | cool | 290 | cool | 253 |
| like | 410 | like | 44 | good | 138 | like | 234 |
| good | 331 | yes | 26 | like | 132 | good | 183 |
| love | 254 | cool | 24 | tank | 125 | hi | 181 |
| hi | 247 | museum | 23 | run | 114 | war | 159 |
| amazing | 232 | think | 23 | amazing | 111 | love | 150 |
| museum | 218 | amazing | 21 | scared | 109 | museum | 141 |
| really | 212 | really | 19 | car | 90 | really | 119 |
| war | 196 | look | 18 | love | 86 | great | 111 |
| great | 184 | love | 18 | awesome | 78 | yes | 111 |
| think | 182 | fluid | 15 | really | 74 | amazing | 100 |
| yes | 149 | things | 15 | wow | 72 | think | 89 |
| awesome | 139 | just | 14 | think | 70 | hello | 77 |
| wow | 134 | species | 14 | lol | 69 | interesting | 71 |
| scary | 130 | extinct | 13 | big | 68 | scary | 63 |
| interesting | 128 | great | 13 | hi | 66 | people | 61 |
| tank | 125 | place | 13 | great | 60 | wow | 58 |
| lol | 124 | specimens | 12 | scary | 57 | place | 55 |
| scared | 120 | change | 11 | awsome | 56 | lol | 53 |
| run | 117 | life | 11 | museum | 54 | sad | 52 |

Table 32: Table highlighting the most popular words in the October 2012 contributions corpus. Words and phrases are spelt and capitalised exactly as they appeared.

When the corpus from each case study is split into the three overarching categories; 'on topic', 'about the museum' and 'noise', it is possible to compare the frequencies of words. The 'on topic' visitor contribution corpus contains high frequencies of terms directly relating to the prompt questions and objects; at the Grant Museum frequent terms include; 'animals' 'yes', 'species, 'extinct, 'specimens'; at IWM London frequent terms include; 'safe', 'away', 'yes' and 'children'; and IWM North frequent 'on topic' terms include; 'tank', 'run', 'car' and 'big'. All three of the case studies 'on topic' terms included some strong emotional terms like; 'sad', 'scary' 'love' and 'like'. This suggests a high level of deep thinking and engagement with the prompt questions and objects on display. The 'about the museum' visitor contribution category for all three museums contains high frequencies of positive adjective; 'cool', 'good', 'like', 'great', 'love', and 'amazing'. The high word frequency words in the noise category contain trival terms like; 'hi', 'hello' and 'lol'. The length of comment may also be used as an indicator of engagement- if we assume that those who are interested in an issue or topic may wish to write at greater length. Indeed the average length of comment increased between categories. The IWM London noise category had an average of 2.9 words, IWM North had an average of 2.7 and The Grant Museum has an average of 5.4 words. The visitor contributions which focused on the museum increased in length with IWM London having an average of 4.7 words, IWM North had 3.7 words and the Grant Museum 6.8 words and visitor contributions 'on topic' at IWM London had an average of 6.6 words, IWM North with 5.9

and the Grant Museum with 16.4 words. This is pleasing, since it suggests that visitors were inspired by the questions to engage with topics in a relatively complex fashion. It is unclear why the Grant Museum presents a higher length of visitor contribution. This may be due to thematic and case approach of QRator rather than the single object focus of Social Interpretation.

Additionally when compared to the SentiStrength results, which classifies for positive and negative sentiment on a scale of 1 (no sentiment) to 5 (very strong positive/negative sentiment), highlights that the 'about the museum' visitor contributions were on average more positive in sentiment ranging from 2 to 2.290 positive (Table 33) whereas the comments 'on topic' had a more balanced response which suggests that more engaged texts often contain a mix of positive and negative sentiment, in contrast to less engagement which is more likely to produce a single sentiment result.

| | **On Topic Category** | | **About Museum Category** | |
|---|---|---|---|---|
| | Positive Sentiment | Negative Sentiment | Positive Sentiment | Negative Sentiment |
| IWM London | 1 | -1.869 | 2 | -1.316 |
| IWM North | 1.429 | -1.883 | 2.290 | -1.174 |
| The Grant Museum | 1.515 | -1.461 | 2.243 | -1.309 |

Table 33: Table displaying the positive and negative sentiment results from all three case studies during October 2012

## 7.5 CONCLUSIONS

This chapter presented the results from all three of the case studies of visitor generated content in museums where data was collected by archiving visitor contributions. Data was collected for a one month period, between 1st and 31st October 2012. Data from the Social Interpretation application installed in the Imperial War Museum North, Manchester, and Imperial War Museum London and the QRator application installed in the Grant Museum of Zoology was analysed in order to identify similarities and differences in the degree of visitor generated content. This chapter provides data to address the main research question focusing on how digital visitor generated content can influence visitor engagement. The analysis uncovered the following issues regarding visitor engagement and the impact of visitor generated content. October 2012 was selected for the study due to the high peak of comments in Imperial War Museum London and Imperial War Museum North.

While determining engagement from visitor generated content in a museum setting is challenging, it is possible to describe broad behavioural trends of contributions. Analysis of the type of contributions left on kiosks in all three case studies indicated that the visitor generated content technology was encouraging users to feel a connection to the museum and in particular connected with the exhibited and themes on display. It is not the place of this thesis to

discuss visitor motivations but it does appear that the visitors leaving 'on topic' contributions were likely to be motivated by a desire to share one's personal experiences or knowledge with other visitors and/or the museum. Although the visitor contributions do not constitute a single distributed conversation but, rather multiple monologues with a few intermittent, discontinuous, loosely joined dialogues between visitors. A significant proportion of visitor contributions added to the IWM North SI kiosks (44%) and QRator iPads in the Grant Museum (45%) expressed a direct response to the prompt question asked about a highlight object or case. Where these comments seem to reflect a degree of consideration, the visitor has engaged with the object in a different and potentially additional way to other visitors. In some circumstances their responses suggest that such an interaction has increased their sense of engagement and connectedness both to the particular object and to the museum in general. For example, a visitor to the Grant Museum, in response to the question, "Dissection can inspire awe in nature and encourages more students to become biologists. Is the use of animals or animal organs justifiable in the name of learning?" placed next to the, Cutting Class case, wrote:

> "I run a school dissection society and definitely think it's important, particularly for younger students, to see what internal anatomy looks like. It's all well and good to look at pictures in a book, but it's a completely different experience to see organs in front of you, especially since they look so different

> in real life to diagrams in books." And another visitor wrote: "Disection should only [b]e allowed if the animal died of natural causes, it is insightful into how other animals work but animals should not be killed for our learning. Last year i had to disect a pigs kidney and many in the class found it distressing knowing that it had come from a live animal."

These sorts of comments suggest that for some visitors, the invitation to offer their perspective encouraged them to relate to the collection in a more considered way. Additionally these exceptionally well considered responses certainly add to the debate the Grant Museum was trying to create.

The type of contributions left on kiosks in all three case studies in some instances indicated that the visitor generated content technology was encouraging users to feel connected with the museum in the sense of providing an 'electronic visitor book', which was an unintended role some visitors ascribed to the kiosks. A significant number of visitor contributions posted via the SI tablets expressed a positive response to the museum and the experience it offers, the Grant Museum with 26.4%, IWM North with 23.6% and IWM London with 19.3%. Although many of these contributions were banal and repetitive (e.g. "I love this museum"; "Wow great museum"), some were more considered ("It is very interesting to learn about how the lives of the citizens that lived during this tragic time."; "Thank you, you have given me a great understanding about the first and second world war."). Although this

sort of commentary was not the intended output of the Social Interpretation project or the QRator project, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the museum content. We can assume that some visitors were prompted by their enjoyment of their visit to share their view with the museum rather than with other visitors as such. In other cases, visitors may have wished to interact with the SI tablets and, finding themselves unsure of what to say, resorted to a generic expression of positive sentiment. These visitor contributions indicate that the digital visitor generated content applications tablets are a facilitator in engendering engagement between visitors and the museum.

There was also a high level of spamming and trolling, and unhelpful commentary particularly at IWM London (48%) and IWM North (28%). Whilst a certain level of meaningless interaction would always have been expected, the actual volume was perhaps higher than expected by IWM. This was almost certainly caused primarily by the number of children who interacted with the kiosks. The volume of inane and banal comments was one of the more negative features of the SI technology in both IWM sites, and was likely to cause many visitors to avoid reading further comments or to leave their own contribution. Despite the high level of 'noise' contributions ultimately the visitor generated content technology at all three sites does appear to have facilitated sharing and

interpretation, and augmented museum experiences, for many of those who used them.

This research has demonstrated that digital visitor contributions can provide valuable information about visitor use of digital technology in the museum space. Analysing a one month period of visitor contributions was a manageable time frame and it is possible to see levels of engagement and contribution patterns emerging. The use of open coded content analysis as a method of data analysis is an effective approach to understanding visitor contribution patterns and interaction behaviour. As highlighted in Chapters 5 and 6, open coded content analysis provides a useful guide for further development and refinement of methods to assess the impact of digital visitor generated content in museums on visitor engagement.

# CHAPTER 8: CONCLUSIONS

## 8.1 INTRODUCTION

In this chapter the main findings of the thesis are discussed in relation to the aims and objectives and conclusions presented. This thesis has attempted to explore how digital visitor generated content systems impact on visitor engagement and to consider the challenges of implementing digital innovation in a museum environment. Stated objectives were to investigate the characteristics of visitor engagement with in-gallery visitor generated content systems, to examine museum approaches towards digital innovation within the museum space, as well as exploring methodological approaches for measuring and evaluating the impact of and level of engagement with digital visitor generated content. The emphasis of this thesis has been upon the wealth of information that visitors choose to contribute about their museum experiences through digital visitor generated systems in the gallery space. This research specifically focuses on whether engagement with digital visitor generated content can be measured utilising the texts produced by visitors and a study of visual behaviour at the digital visitor generated content application exhibit-face. We have tried to use our three case study institutions to gain some insights into how digital visitor generated content applications impact on visitor engagement and what challenges digital innovation projects create for

museums. This chapter then goes on to discuss the limitations of the study and the possibilities for further research in this area.

## 8.2 DIGITAL VISITOR GENERATED CONTENT AND VISITOR ENGAGEMENT

Researching experiences with digital visitor generated content systems has been critical to gaining an understanding of active visitor behaviour and levels of engagement. From the analysis of the visitor contributions to both QRator and Social Interpretation it is possible to draw some conclusions about the visitor engagement levels with regards to digital visitor generated content applications in the museum spaces. The textual visitor contributions fell into three broad categories: 'on topic', responding to the object or question; 'about the museum', contributions directed towards the museum or exhibition; and' 'noise', irrelevant and/or banal responses. It is likely that the motivations for contributions differed for each of these categories. Some 'on-topic' contributions involved an opinion or reflection; in others visitors offered a piece of information, whether from personal experience or general knowledge. For both these types of contributions, the motivation seems to have been a genuine desire to share a personal statement about the object in question with other visitors. In the case of the 'about the museum' contributions, responses directed at the museum or the exhibition, the nature of the contributions suggested that some visitors treated the screens as a form of electronic visitor

book. It can be assumed that some visitors were prompted by their enjoyment of their visit experience to share their view with the museum (rather than with other visitors as such). In other cases, visitors may have wished to interact with the digital visitor generated content applications and, finding themselves unsure of what to say, resorted to a generic expression of positive sentiment. This raises the question of whether a digital technology used in this way promotes an opportunity for visitors to make meaning from their whole experience, rather than engage with the exhibit specific content and interpret the exhibitions themselves. However we consider these one word answers as short evaluative comments which should be considered as important evidence of visitor engagement. In particular, the high percentage of opinion terms within these short evaluative comments does suggest that the opportunity provided by the digital visitor generated content applications for visitors to give their opinion, has had a positive impact on their engagement with the museum.

A significant proportion of visitor contributions added to the visitor generated content systems at all three of the museum case studies expressed a direct response to the prompt question asked about a highlight object - albeit sometimes tangentially. Where these comments seem to reflect a degree of consideration, the visitor appears to have engaged with the object in a different and potentially greater way than other visitors. In some circumstances their responses suggest that such an interaction has increased their sense of engagement and

connectedness both to the particular object and to the museum in general. For example, a visitor to IWM North, in response to the question "How would you feel if you had to fire this gun?" placed on a SI kiosk next to the Field Gun, wrote: "I would feel scared because I might shoot my own people" and another visitor wrote: "I was in the 1st regiment rha no.14109585 between 1946 1948 and also in [th]e battery, memories flooding back". These sorts of comments suggest that for some visitors, the invitation to offer their perspective encouraged them to relate to the collection in a more personal way.

A significant number of visitor contributions posted via the visitor generated content systems expressed a positive response to the museum and the experience it offers. Although many of these contributions were banal (e.g. "Great museum"; "THE BEST MUESEUM EVER"), some were more considered ("Really brings home the devestation that war and [ ] conflict brings "; "Thank you, you have given me a great understanding about the first and second world war." And "I love the insight the Imperial War Museum gives you into the war and how hard it must have been."). Although this sort of commentary was not the intended output of the digital visitor generated content systems, which aimed to encourage interpretation of the museum objects and themes themselves, in most cases it seems to express a genuine sentiment, and suggests that visitors do feel connected to and engaged by the museum. These visitor contributions indicate that the digital visitor generated content applications are a major facilitator in

engendering engagement between visitors and the museum. The QRator iPads and Social Interpretation kiosks engage some visitors, merely by their existence as material objects in the museum space, and then working with the visitor and the museum as a further actor resulting in a response which neither is about the object generally or a response the prompt question positioned on the kiosk screen.

It is impossible to discuss visitor generated content without touching upon the concept of the democratisation of knowledge. As discussed in Chapter 2, and supported in Chapter 6 numerous authors have expanded upon the concept of there being space for visitor dialogue within museums (Hirzy 1992; Hooper-Greenhill 1999b; Weil 1999; Simon 2010; Byrd Phillips 2013), but there are risks attached to this opening up of knowledge. There are continual debate surrounding the changing nature of authenticity, authority, control, and voice, (Simon 2010; Crow and Din 2011; Stein 2012) which are central to defining how museums can meaningfully engage and co-create with visitors. Through experimenting with digital visitor generated content technology, the case study museums have begun to embrace the concept of co-creating and sharing authority with visitors, but it is still unclear whether democratisation of knowledge has occurred. It is difficult to report on whether there is a democratisation of knowledge through digital visitor generated content because there is very little data on whether visitors commented, or read the contributions of other visitors. However, a few comments did specifically mention reading

other visitors' contributions: "These interactive pods are a great experiment - feel like i'm in a conversation abbout the artefacts and its nice to see other peoples voices - makes the pieces feel more alive, great idea!" [*sic*]. There is also evidence of visitors responding to other visitor contributions: A visitor in the Grant Museum stated: "I wouldn't mind to see a model of the porcupine fish not puffed up" and another visitor responded: "There's a deflated puffer fish in case 64!" Additionally, the corpus data does show some evidence of the potential for this democratisation of knowledge to happen with large proportions of the visitor contributions at IWM North (Chapter 6) and the Grant Museum (Chapter 5) being categorised as 'on topic' social interpretation. There is some sharing of information and opinion occurring, however, the degree to which this is leading to the democratisation of knowledge is more questionable. Specifically as many of the visitor contributions were one or two word responses and it is hard to see how these would add a different dimension to a visitor's knowledge and understanding. The visitor contributions do not constitute a single distributed conversation but, rather multiple monologues with a few intermittent, discontinuous, loosely joined dialogues between visitors and the museum. It seems that the nature of the comments worked against the construction of a visitor narrative or flowing interpretation, or set of comments, or even a form of knowledge that might have challenged the voice of the museum.

The research indicates that some visitors were willing and open to reading other voices in the museum. It is believed that the digital visitor generated content applications represent a shift in how museums act as trusted and authoritarian institutions; communicate knowledge to visitors; and integrate their role as keepers of cultural content with their responsibility to facilitate access to content. Analysis suggests that visitors are willing to take part in a dialogue, and express their views about their visit and individual object via digital visitor generated content applications. It further suggests that in most cases they can be trusted to do so in a thoughtful, serious fashion. There are drawbacks however. It is not possible to quantify individual visitor contributions, so it is impossible to comment on whether or not visitors are adding more than one comment to the digital visitor generated content systems. Regardless of this, the opportunities that digital technology and participatory media bring to museums far outweigh the challenges. This thesis has begun to demonstrate that a change from a one to many transmission to a many to many interaction, in which museums use their own voice and authority to encourage participatory communication and content creation with visitors is a positive step. The growing emphasis on digital innovation and the interactional and participatory nature of learning in museums provides the perfect opportunity to investigate the impact of digital technologies as resources for engaging visitors in exhibits and more generally in museums as a whole (Thomas and Mintz 1998; Marty and Burton Jones 2007; Heath and Lehn. 2010).

This research has demonstrated that digital visitor contributions can provide valuable information about impact and visitor engagement with digital technology in the museum space. This thesis has suggested that one of the main benefits of using open coded analysis as a framework for evaluating digital visitor generated content is the detail that this method can provide. It is possible to scrutinise individual visitor contributions for elements of visitor experience, and categorise styles of comments to ascertain levels of engagement. Visitor comments tend to be an underutilised resource in terms of museum visitor research, often overlooked in favour of other more targeted research methodologies. In the few cases where these types of data have been used they have proven to be fruitful in terms of enhancing our understanding of visitor experiences. The analysis of digital visitor generated content is no exception. This research has shown that utilising open coding analysis to explore visitor generated content is a worthwhile method for capturing the often insightful, emotive responses of museum visitors within the context of the museum environment. The open coded content analysis provides a better understanding of the contribution patterns and interaction behaviour of museum visitors, and offers a valuable guide for further development and refinement of methods to assess the impact and value of digital visitor generated content in museums.

## 8.3 PRACTISING RADICAL TRUST

A significant discovery during this research is that of practicing radical trust. Radical trust is based on the concept that shared authority is more effective at creating and guiding culture than institutional control (Lynch and Alberti 2010). As seen in section 2.2.3 from the review of previous literature on radical trust that in order for museums to meet visitor expectations of being participator 'democratised; spaces museums need to develop a new form of trust (Marstine 2013; Lynch and Alberti 2010; Lynch 2013a). One of the underlying aims of utilising visitor generated content, and in this case digital visitor generated content, is to provide visitors with more of a voice, and to enable them to participate in the creation of museum content. In so doing, it is argued, there is the potential to challenge the museum's voice of authority and authenticity and to enable the democratisation of knowledge. However, whether in practice this re-balancing of the audience/authority relationship is realised, or even seen as desirable is another question. The evidence laid out in Chapter 4 which looked at how the Grant Museum utilised radical trust by not controlling the final interpretation produced by visitors in the QRator project suggests that by practising radical trust the Grant Museum has taken a proactive role in enabling responses and interpretations from multiple sources, supporting Hooper-Greenhill's vision of a democratised museum that "enables new voices to be heard" The QRator content is genuinely co-created, representing shared authority of a new interpretative narrative

that continuously develops with each new audience contribution. The research goes on to suggest that radical trust in visitors does indeed work: spamming and inappropriate commenting does not appear to have happened to a significant extent in the Grant Museum (chapter 4) or IWM North (chapter 6). There were issues with 'noise' comments at IWM London (chapter 5), potentially indicating that digital visitor generated content applications are better suited to smaller museums with lower visitor figures than a large national institution, or fewer visits from school groups. This assertion is supported by the finding that less people contribute engaged and 'on topic' responses in busy periods. Significantly, the type of visitor generated contributions were not seen to pose a challenge to the voice of the museum due to the quality and type of comments that were left on the kiosks, many of which as we have seen in particularly in the case of IWM London, were trivial and banal. Additionally there were initial concerns that a comment made by a visitor could cause harm or damage to both the institution and the visitor in question. The noise category represented a significant risk, in particular, for Imperial War Museums. From the outset of the project a major concern of the project team was that the reputation of IWM could be harmed if the engagement of visitors was not managed appropriately. IWM as an organisation is, by one definition, a huge repository of objects that, when presented to the public for comment, could lead to dialogue visitors may find distressing and/or deeply objectionable. Based on the analysis of the visitor contribution data, it appears that a good balance has been struck in this

respect. The potential problem of hateful or inaccurate commenting has not generated difficult dialogues in the museum space, nor has it caused unwanted media attention for any of the case study museums. There were no incidents involving problematic dialogues, with very few as what might be seen as 'high risk' visitor responses being made – the usage of racial slurs for example. Therefore it appears that this potential problem has not become one in reality. The reputation of all three museums was not damaged. Through the QRator and Social Interpretation projects it appears that the Grant Museum and IWM has begun to embrace the concept of 'radical trust' in the visitor community. By offering opportunities for visitors to consume and co-create digital interpretation, the institutions have taken a proactive role in developing new interpretations around museum collections, enabling direct experience of content production. There may be unanticipated consequences in relinquishing authority and utilising radical trust in this way, consequences that it is not possible to predict, but, by focusing on the positive the radically trusting museum has the potential to be part of the 'participatory sphere' (Cornwall and Coelho 2007, p.8) where individuals can share experiences and participate on equal terms. The digital visitor generated content systems have provided a platform to help to discover visitor stories and experiences and share them with a wider audience, providing a broader, more personal interpretation of museum collections. This new co-creation of interpretation has enabled the visitors' active role in creating meaning of their own museum experience to be highlighted. Each visitor has

their own agenda, identity, motivation and interests, and will approach the museum with different perspectives (Ross, Carnall, et al. 2013). As a result, visitors are able to share their own 'digital stories', narratives constructed from their own interpretation of museum collections and experiences.

## 8.4 VISITOR BEHAVIOURS AND ENGAGEMENT LEVELS

The exploratory study as part of this thesis performed a detailed video based study of how visitors approach, examine and engage with visitor generated content technology in order to investigate visitor behaviour characteristics and engagement levels in museum spaces. The aim was to bring to the fore behavioural characteristics in relation to visitor generated content on museum digital devices which may be worth examination in further studies. As highlighted in Chapter 3 observing and tracking visitors has become one of the most consistently used methods in museum evaluation because it is able to indicate the extent to which visitors are behaving in the expected and intended manner. The observation sessions at all three institutions highlighted that visitors spend a long time in the museum spaces and show a range of behaviours and levels of engagement. The observation data in section 5.5 highlighted that in IWM London the majority of visitors observed displayed a cursory level of engagement; where visitors would look briefly at an object or interpretation labels in a cursory or non-studied

way. Whereas the visitors observed in IWM North (section 6.5) and the Grant Museum (section 4.5) were much more engaged and displayed moderate to extensive levels of engagement. In this instance, observations as a method for exploring the kinds of visitor behaviour characteristics in relation to digital visitor generated content in the museum space had relatively little impact on our understanding of visitor engagement. The observations only produced basic insights into behavioural responses and a more general understanding in to levels of engagement. If we were to undertake field observations again, a much more through study would be undertaken solely focussing on "exhibit face" observations in an attempt to understand visitor behaviour characteristics and engagement rather than mapping behaviours throughout the visit.

Studies of visitor behaviour primarily investigate how people behaviourally and cognitively respond to the design and layout of exhibits. However, they largely ignore the behavioural responses at the "exhibit face" (vom Lehn and Heath 2006) or the "fat moment" (Garfinkel 1967) of visitors' action. This research focussed on the "exhibit-face" and studied how visitors approach and examine digital visitor generated content applications in museum spaces. Through the analysis of the video based observations from IWM North (see 6.6) and the Grant Museum (section 4.6), four categories of engagement with digital visitor generated content have been identified. These include;

minimal, cursory, moderate and extensive. These categories highlight the importance of using pointing gestures and shifts in posture for understanding and sharing content and focussing attention on a particular element of digital visitor generated content or associated museum object. It highlighted that visitors employ pointing gestures and bodily conduct to align their standpoint to the digital kiosks and its features. Visitors organise their body movement, gestures and social interaction at exhibits to portray and animate specific features for each other.

Experiencing museum objects and the digital visitor generated content associated with it is a process that takes place at the confluence of a number of contexts that are constantly negotiated through the visitors themselves. Different levels of engagement can be found at the intersection of all those contexts. Analysing visitor's textual contributions only provides a glimpse of those contexts while setting aside the possible ways through which visitors infuse their experiences through gestural behaviours inside the museum space. In addition to studying visitor contributions, micro-analysis of the physical means through which visitors make and share their experiences has contributed towards an understanding of the visitor engagement process and has provided an awareness of the range of contexts in which even a short encounter with a digital visitor generated content applications can occur.

## 8.5 REFLECTIONS ON DIGITAL INNOVATION PROJECTS IN MUSEUMS AND RECOMMENDATIONS

The overarching objective of this thesis was to investigate how digital visitor generated content systems in museums spaces impact on visitor engagement. But the concept of digital visitor generated content is part of a much larger issue; that of digital innovation. Digital innovation projects are becoming increasingly significant in the development and delivery of engaging visitor experiences in museums in the UK, but as section 2.4 indicates the rationale behind them and the impact they are having on not only visitor engagement but also how digital innovation is being managing and the bearing this has on museum practice is not always clear. Therefore the question of understanding the impact of digital visitor generated content on visitor engagement must be guided by an understanding of a baseline of characteristics that define digital innovation in museums and it is imperative to gain an awareness of the challenges museums face when implementing digital innovation projects. With this in mind this research has been investigating what digital innovation is in a museum context, and the challenges entailed in implementing digital innovation and the impact this has on the institutions. This research has highlighted a number of issues and challenges that museums face when conducting digital innovation projects. In the following sections we will pick out some of the aspects that have emerged as themes of the thesis and propose some ways by

which the museum sector might tackle them and improve the prospects for digital innovation projects in the future.

### 8.5.1 THE PROCESS OF DIGITAL INNOVATION

Innovation projects undoubtedly vary in their impact on a project and on the institution as a whole. As discussed in Chapter 4 the Grant Museum welcomed the opportunity to experiment in their new exhibition space and with new visitor generated content technology[145]. The Grant Museum has an open and experimental ethos and has a strategic objective to create a physical and intellectual space for more than one interpretation scheme (Carnall et al. 2013, p.56). The museum staff were keen to review the purpose of a university zoological museum and in particular to "make it a vibrant place for experiment and dialogue by offering provocative, interactive and regularly changing displays" (MacDonald and Ashby 2011, p.471). This was a useful attitude and enabled the smooth creation and implementation of the QRator system into the museum space. The QRator project was deemed a huge success not only winning the 2012 Innovations Award at the Museums and Heritage Awards for Excellence but also being cited in the New Media Consortium Horizon Report: 2011 Museum Edition (Johnson et al. 2011). The New Media Consortium Horizon Report cited QRator as being four to five years ahead of 'the adoption horizon' for the sector as a whole, which is a promising outlook.

[145] Nelson and Macdonald (2012) highlight that there is an irony in the perception of university museums (2012, p.419). They argue that despite the fact that universities are places where innovation is paramount, university museums have a reputation of being traditional. University collections have been likened to "mausoleums" that function to protect the legacy of the institution itself, rather than as sources for new discovery (Were 2010). This is not the case at UCL Museums.

In comparison, with Social Interpretation it became apparent very early on in project progress that there were numerous challenges around working in an agile, user focused manner, in a large institution like IWM, particularly when working with limited budget, resources and time (The SI project had to be completed within a year). The project quickly became a balancing act between stakeholder management, minimal content and appropriateness of hardware and software to design, produce and deliver three applications with a viable visitor experience on each. The case studies in this research generated a number of lessons about the way that digital innovation projects are conducted in museums, which are discussed below.

### 8.5.2 THE CHALLENGES OF DIGITAL INNOVATION

The Social Interpretation project and the QRator project both utilised innovative practice to fundamentally challenge the way in which museums interact with, and provide for, its visitors. Both projects faced a difficult task; to rebalance the authority/audience divide; turning museums into social, participatory organisations, and for IWM the syncing the online, mobile and in-gallery experience. The QRator project faced a somewhat easier task being housed within a university zoology museum, compared to the Social Interpretation project, which was within the setting of a large national museum, tackling a difficult and challenging subject matter, across two sites. It was a risk – and to the museum's credit, one it was willing to take. It has been suggested

that creating a culture in museums that embraces risk is a prerequisite to allow significant innovation to take hold (Stein 2012). A certain amount of risk is always associated with digital projects because they are 'new', and 'innovative' but there are uncertainties about how much risk is too much risk.

Both projects followed agile project management principles[146], a user centred approach[147], and both had limited funding which required both projects to be undertaken quickly. One of the challenges with digital innovation lifecycles and museum exhibition lifecycles is that they are completely different. The pace of technology change was raised as a concern in the literature in section 2.4.1 and in practice, as seen in Chapter 5; the pace of technological change is undoubtedly misaligned with the fiscal, creation, development and installation cycles of museums. In a climate in which new technology platforms emerge on a weekly basis, there is a dramatic mismatch between the cycle of technology and the long planning phases that exist for most museums exhibitions and public programming. This was a particular issue for Social Interpretation as highlighted in chapter 5. By the time the project funding had been secured, the *A Family in Wartime* exhibition, of which SI wanted to be a part of, had already been signed off and was waiting to be installed. This left SI little time to develop, iterate, install, robustness test and to be fully integrated into the exhibition.

[146] http://agilemanifesto.org/

[147] A user centred approach is one that puts the intended users at the centre of its design and development

In order to successfully implement digital innovation projects in museums it is important that realistic time-scales are adopted for all project partners, as developing digital applications from the ground up can take a significant amount of time, and not allowing for this can lead to delays which then affect all other aspects of innovation. It is also important to ensure that the project scope is achievable and not to be afraid to pare back the original idea if required. Unrealistic scope and timescales mean missing deadlines, which can affect the benefits of the research leading to a lack of opportunity to feed the project findings back into the research and development process.

### 8.5.3 COMMUNICATION AND ADVOCACY

From the outset of both projects, the QRator and SI project teams aimed to be as open and transparent as possible and stressed the necessity of including users, stakeholders and the project team in the digital visitor generated content systems design process. This worked really well in the Grant Museum, with all stakeholders, users and the project team being actively involved in the design and implementation of QRator. A huge success was having buy-in from the museum curator, museum manager and Director of UCL Museums and Public Engagement from the beginning of the project. The SI project, in comparison, had some difficulties. One of the key challenges for SI was that the main museum project advocate left the museum just at the point when the first

deliverables went live in the gallery space. This left a hole in the project which meant that it became harder to keep the communication and advocacy going throughout, and required other people in the project team to take on this additional responsibility. In reality, in a large institution, this openness and transparency can be very different to sustain. The lack of overall leadership and advocacy for the project created a lack of coherence which left the SI project in a position where its resources were not organised fully across departments, and in some instances the project failed to retain knowledge of operational and management systems, and where as a result decisions were poorer and communication between departments broke down. There is always the aspiration of transparency and open communication, but unfortunately, as exemplified by the SI project, the day-to-day running of a project often takes over. Once a project reaches delivery mode, the ability to communicate everything, to everyone, continuously, becomes increasingly hard to do and can massively slow down agile development.

Therefore museums need to ensure that digital innovation projects have senior management buy-in, and that all relevant departments and sites are 'on board' with the project. It is important that those leading the project are empowered and given the leeway, freedom and authority to make decisions, rather than having to secure institutional permission at every stage in the process. Otherwise this can act as a barrier to innovation and development. Additionally, as Scott (1990)

points out, leaders need to have both cognitive (decision-making) and motivational (cathectic) roles, and both are crucial to inspiring project team members to "develop faith in and commitment to the larger moral purpose" of the activity they are engaged in (*ibid.*, p. 41; see also Suchy 2000). It is essential for any digital innovation project that the project leader can offer a clear direction, provide motivation and advocacy both within the team, but also internally and externally to the institution.

Competent leadership goes hand in hand with good channels of communication. Clear, regular and transparent communication is required, not only externally but internally, so all parties involved are aware of any changes, and are able to react and continue to provide input into the project. This is particularly important because what might seem unimportant to one party might have a significant impact on the ability of the other project members to complete tasks. Ideally a digital innovation project requires someone leading on internal communications, otherwise arguably the most important aspect of a digital innovation project gets left behind when the deadlines begin to loom.

### 8.5.4 ADAPTING AND COMPROMISE

This research has highlighted that flexibility, adaptability and accepting change are key components of digital innovation projects. The nature of digital innovation means that things can change quite quickly and

often, for example in terms of what is possible. As a result of such changes, there can be impacts upon such things as development potential, methods, installation, evaluation, and analysis. There is therefore a need to be able to react quickly to changes to the project, but also to find the space to accommodate these. It is important to constantly refer back to the aims and objectives of the project, and to reflect on the sections of work previously completed. Project teams need to become very good at adapting to change and adjusting the process accordingly to match that change.

### 8.5.5 REDUCING RISK, UNCERTAINTY AND PROVIDING ADEQUATE RESOURCES

This research has turned repeatedly to the issue of trust and risk and the impact this has upon digital innovation projects. From the outset of this research a major concern of the museum staff at all three institutions was that the reputation of the museums could be harmed by opening up to greater participation by visitors. Allied to concerns regarding the risks associated with digital visitor generated content was the challenge of how to moderate visitor engagement. All three institutions undertook a post moderation stance; with IWM London and IWM North extending their moderation practices by enabling visitors to moderate visitor responses as well as staff. As discussed earlier, this research suggests that 'radical trust' in visitors does work: spamming and inappropriate commenting does not appear to have happened to a

significant extent in the Grant Museum or IWM North. There were issues with 'noise' comments at IWM London, potentially indicating that digital visitor generated content applications are better suited to smaller museums with lower visitor figures than a large national institution. Thankfully, from one perspective, IWM's fears did not become a reality. Despite some comments needing to be moderated because they were banal, no major complaints were raised and there has been no negatively oriented media coverage for the museums to deal with. However, another key risk has emerged and has had an impact upon digital visitor generate content projects: the banality of the comments, and the extent of noise contributions, that were experienced by IWM London. In no way do we believe this has had a particularly major impact upon the organisation, and it has to be remembered this was a pilot innovation project. Yet, such an outcome does suggest the need to reflect upon the benefits of conceptualising risk in a much broader fashion. Nevertheless by offering opportunities for visitors to consume and co-create digital interpretation, the three case study museums have taken a proactive role in developing new narratives around museum collections, enabling direct experience of content production. Ultimately by providing visitors with an interactive digital means to comment, and employing minimal moderation, the three case study museums have allowed visitors to actively engage with museum collections and interpretations and have enabled these visitor comments to be displayed in conjunction with museum interpretation. Importantly throughout all three of the case studies there were

examples of social interpretation, where it was evident that consideration, emotion and thought had gone into the visitor contributions. There was also evidence of questions being posed to the museum, and the museum text being questioned. It is here where we can begin to see the potential for digital visitor generated content to provide a digital means through which the voice of the museum could be challenged. There is clearly an appetite from parts of the case study museum visitors to have a dialogue with and a meaningful connection to the museum. If museums are serious in their intention to engage with visitor participation and co-creation, then they will need to face up to the challenge that 'being social' entails (Kidd 2011). Museums need to find a means to enable this visitor engagement to be a dialogue rather than a one-way communication. The Grant Museum is beginning to deal with this by utilising social media as a means of breaking down communication barriers and getting more discussions going:

> We want to be more responsive. I'm sure different museum managers would answer differently, because I think and the staff here get it, that things like social media are important. It is everyone's [all staff's] responsibility to be responding to social media, rather than responsibility residing with one 'digital' staff member. QRator is very similar. It is very important that we should be responding to visitors. When we get questions like 'where do you get all these skeletons from?' – We don't really have an adequate way of responding to that, but it important for

> us to know that our visitors want to know more information about it. So if we get a large proportion of QRator comments asking the same question it influences what we do. For example from the QRator responses it is obvious that our visitors want to know about that issue so we have created a temporary installation about museum acquisitions (Ashby 2013 pers. comm. 25th November).

In comparison, IWM struggled with moderation and they believe they;

> Need to look at developing a suitable workflow to manage VGC and to be clear about what our aims and goals are when asking the public to participate in this way, and how we measure success as an organization – i.e. is it reach, is it quality of engagement, how does it/or does it need to benefit the organisation? This should be tied into a wider Engagement Strategy (Royston pers. comm. 15th December 2013).

This response suggests a certain amount of reticence to open participation up unless there is a measurable benefit to the organisation. This may well be a resource issue, as the number of visitor contributions requiring a response from the museum, are significant. However, having raised expectations, a lack of responsiveness from the museum will do little to encourage further participation from its visitors.

The issue of resourcing is of key importance. For example, the SI project conducted a risk assessment at the beginning of the project but a full resource assessment was not completed. One of the key lessons the SI project generated about conducting digital innovation is the importance of both a resource assessment and a risk assessment, at the start of the project. Digital Innovation projects generate many excellent ideas for increasing reach and engagement with visitors, but they are likely to require considerable resource in terms of staff time for effective delivery. For example, in the SI project, the visitor generated content kiosks generated a significant amount of social interpretation of visitor contributions. Moderating such high levels of activity was a considerable task for the IWM team, often having to look at over 500+ individual comments per week. The work was divided up between team members and was just about manageable over the lifetime of the project. However, any commitment to moderation going forward would require further thinking around how to make it more sustainable in the long term. There are important lessons here for the wider museum sector, as there is a need to recognise the degree of resource required to meet the needs and expectations of a more participatory and engaged audience. The risks of not delivering on certain elements should be carefully assessed and resource allocation should be determined, before deciding whether to proceed with each element of the project.

### 8.5.6 RAISING AWARENESS

Marketing communications are a vital part of the success of any innovative project. Visitors need to be informed that a new initiative is available. Ultimately, if a new initiative is launched with a very low profile, then it is likely to be missed and not used fully. A key learning from both QRator and SI is that there is more likelihood of a project being promoted by marketing and communications if it can be incorporated into a wider programme of activity. Anything that isn't regarded as such can become 'extra' work and harder to promote. It is important to understand the likely visitor's response to the digital innovation project, so messages of reassurance to visitors can be included in marketing communications.

### 8.5.7 BUILD IN EVALUATION

This research has shown that digital innovation is difficult to evaluate. The QRator project needed a framework for measuring success accordingly; however, the Grant Museum staff decided that due to the experimental nature of the project that a framework would be organic and it was predicated upon experimentation, monitoring and evaluation of audience reaction to QRator that success metrics could be developed (Carnall et al. 2013, p.62). For the QRator project success was as much about process and organisational change as it was about delivery and

outputs. This is a beneficial attitude to take when dealing with innovation projects. For the SI project, digital engagement was quite subjective, one person's positive was another's negative. It is essential to manage expectations and to be clear about measurements of success. However, creating a framework for measuring success with digital innovation projects is quite difficult as it may be that only very vague notions of how and what the outcomes of the projects may be. Both QRator and the SI project were continuously evaluated throughout the project process, utilising User Centred Design (UCD) processes. UCD explicitly and actively includes users in the development process from an early stage. Focusing on user requirements should enable a digital innovation project to become embedded and owned by the visitors, creating a comprehensive collaborative system specifically designed to the requirements of the users. UCD processes focus on users through the planning, design, development and implementation of a product. For any digital innovation project it is important to embed evaluation activity into the project from the beginning. There is a need to go beyond quantitative metrics. Mechanisms to understand the dynamics of interpretation, visitor exchange and engagement are required on a real time basis in order that user focused iterative adjustments can be made quickly.

### 8.5.8 INCREMENTAL INSTITUTIONAL CHANGE

Despite the many challenges of the projects, both the Grant Museum and the Imperial War Museums have learnt a lot about digital innovation practice and would certainly be better prepared to undertake another digital innovation project in the future. Whilst the project outcomes were variable, all have been valuable in some way. Not everything was successful but the museums are now attempting to assess the findings and to apply them to future activity. On reflection, the ambitions of the SI project were probably beyond the budget and the 1 year period available. However, the appetite to take risks and to innovate in digital development is still strong and supported by the museum.

Although this investigation found little research on digital innovation in museums (see section 2.4) it is clear from the results and on-going conversations about the important of innovation in the field that this is an important issue for museums. All of the case study museums are currently involved in projects that are looking into how digital innovation can extend visitor engagement, and want to continue experimenting with technology and visitor experience. As Jack Ashby states;

> We definitely want to continue experiment with technology for visitor experience because it is our key role as a university museum to act as a test bed for experimental research. QRator

> has been the biggest visitor engagement project in the two and half years that we have been in our new location, but if it weren't in the museum, we would just be a load of old bones." (Ashby Pers. comm.,25th November 2013).

Additionally Carolyn Royston notes;

> Digital transformation is happening in a number of different ways – through delivery of key digital transformation projects, by raising the digital capability of staff and promoting digital leadership, and by introducing transformative digital processes such as agile project management methodologies across the organisation enabling us to prototype rapidly, gain feedback and iterate. We have also introduced new approaches to content commissioning and production, developed new audience types for our digital channels, and introduced new industry standard roles for digital to widen the skills and knowledge based within the Digital Media department beyond the experience of the museum sector. New posts with a digital focus are appearing across the museum and digital competencies have been introduced as part of a wider competency framework – to raise standards and expectations around digital skills, ensure digital is integrated fully into planning, delivery and sustainability of our services and to be explicit that as an organisation we need to embed digital instinctively in our work (Royston pers. comm., 15th December 2013).

This research highlights the challenges of implementing digital innovation in a museum environment. In particular it emphasizes the issues of trying to work in an agile and user centred manner especially in a large national museum, such as IWM. There is a requirement to establish an infrastructure that supports the creation and implementation of innovative digital projects, which can require institutional change, often at a pace that is difficult for the organisation to manage. Institutional change, however, requires a tentative approach to change in a culturally sensitive manner. Communication and advocacy is key. There is a necessity to have a strong group of internal advocates for the project and to avoid an over reliance on a single person or small group of individuals. There is also the issue of managing expectations: not only the expectations of the museum visitors but the institutional expectations. A lack of communication is usually at the root of most problems associated with different expectations. When communication is direct and transparent, trust forms and helps to create a solid foundation for all stakeholders. With traditional projects, strategy would be agreed with the aims and objectives and the timescales for completion. Due to the agile nature of digital innovation, the strategy, objectives and timeframes are in a constant state of flux; leaving the project at risk of others not understanding what 'success' is and how it should be measured. For example, in the case of the SI project, not enough time or space was built into the project to manage confusion over expectations and difficult conversations on measurement. What this research highlights

is that it is essential for thoughtful action based on insight in terms of digital innovation. Institutions must understand their resources, processes and values (Christensen 1997) to address the specific challenges they face. In order to maintain success with digital innovation there is a need to work with the strengths and values of the institution and that of the technology advocates. It is important to be clear about what the project team considers success and be open and flexible, and the true value of the project will emerge.

## 8.6 LIMITATIONS OF THE RESEARCH

Whilst this study makes a significant contribution to understanding use of and engagement with digital visitor generated content systems in museum spaces, the limitations of the research must be acknowledged. The museum digital environment is still in development and changes occur rapidly. Consequently, this investigation has had to deal with a moving target in terms of digital innovation, visitor generated content technology development and institutional changes. The research area was limited to three full contemporary case studies in which the author was embedded and where, subsequently, there was access to comprehensive project documentation, systems, archives and individuals in various roles. Although The Grant Museum, Imperial War Museum London and Imperial War Museum North are very different organisations, with equally divergent collections and the size and

complexity of the digital visitor generated content projects were distinctive. Three case studies alone can reflect only a fraction of the range of digital innovation projects that museums are undertaking and certainly only represents a minor sample of the challenges museums face in developing digital visitor generated content. This without doubt limits the lessons that can be drawn from them. Nevertheless the research did not aim to be representative of all museums, but rather present three case studies which will have implications for other cultural institutions. This was considered to be preferable to present a small number of in-depth case studies in the fullest possible detail than to sacrifice depth for larger numbers of case studies in digital innovation. It is also important to note that, because of our particular interest in digital visitor generated content, the case studies were selected primarily in order to enhance our understanding of how digital visitor generated content in museums are impacting on visitor experience, whilst also focusing on the challenges of digital innovation. Our expectation was that greater insights would be found by examining the finer details of each case study than by increasing the number and variety of digital innovation projects.

This study specifically chose to subvert the usual lines of museum visitor investigation by exploring non-obtrusive methods of data collection in order to understand the engagement with digital visitor generated content, without asking the visitors themselves. The research was limited to examining the wealth of information that

visitors choose to contribute about their museum experiences through digital visitor generated systems in the gallery space. This research examined visitors' digital output; firstly an investigation into the texts produced by visitors and then a study of visual behaviour at the digital visitor generated content application 'exhibit-face'. The analysis of visitor contributions proved to be a particularly useful method in understanding active visitor responses to museum content and visitor contributions on digital visitor generated content. This thesis might have gained from more direct engagement from visitors. Future research involving more traditional forms of visitor research, including interviews, surveys and conversation analysis may be beneficial for creating a fuller picture of visitor engagement with digital visitor generated content. The chief reason for not pursuing this line of evidence was that our main focus was on a need to understand what evidence can be gathered from digital visitor generated content. As more museums are utilising digital technology to gather visitor perspectives we need to develop methods that do not demand the resources of time, money, and research expertise that are characterised by traditional visitor research efforts. To that end, this study had a pure research focus, that of digital outputs. Nonetheless, there is undoubtedly an opportunity to consider digital visitor generated content evaluations as part of a continuum of visitor studies methods to create a fuller picture of visitor engagement with digital visitor generated content, and to compare the perspectives. Ultimately, understanding visitor engagement with digital visitor generated

content is not a straightforward or transparent matter and there is some fascinating future work to be done by continuing to subvert the usual lines of investigation particularly by exploring the responses produced by visitors in museum spaces. In particular it would be fascinating not only to focus on textual contributions produced by visitors, but also to look at how visitors use imagery (photographs, drawings etc.) to express engagement in the museum space.

## 8.7 CONTRIBUTION OF RESEARCH

The research presented in this thesis contributes to academic researchers and museum practitioners in four ways: through a fresh approach to our understanding of digital innovation in a museum environment, together with a understanding of digital visitor generated content and; through the depth of the case studies themselves; and in the form of some practical findings about the challenges of implementing digital innovation projects in museums.

Although there is a growing recognition of the importance of R&D (research and development) and innovation in museums, research on the growth of these projects is still scarce. Previous studies of digital innovation tend to focus on financial resources and capabilities on the growth of other industries and disciplines, particularly science and technology. Chapter 2 highlighted the paucity in our understanding of change and innovation in a museum environment as well as a lack of

research into the impact of co-creation of visitor experience in museums. These two concepts were central to the research questions posed in this thesis; namely that there is a requirement to understand and articulate the impact of digital visitor co-creation in the museum environment and to discuss the challenges of implementing digital innovation projects in museums and the implications this has on institutional change. Two key issues came out of the research into digital visitor generated content: the importance of radical trust; and the fact that post moderation with visitor generated content does work. These findings are likely to be useful for museum practitioners who want to undertake digital visitor generated content projects in the future. Additionally this thesis identified a numbers of challenges about the way that digital innovation projects are conducted and how they could be overcome. These challenges are directly relevant to museum practitioners who want to undertake digital innovation projects in their own institutions. An understanding of digital innovation projects in museum environments also is of direct relevance to digital humanities scholars focusing on creation and impact of digital resources in the humanities.

A third contribution comes from the three case studies presented in this thesis. Each study is noteworthy in its own right and none has previously been the subject of a detailed investigation of this sort. Although not exhaustive, the evidence we offer is multi-dimensional and unprecedented in its detail.

Fourthly there are the recommendations that we identified earlier. Some are commonplace amongst the digital humanities academic community (such as adequate timing and pre-determining what success might look like, whilst others (such as the need for empowered digital advocates) are only now becoming more widely deliberated. It is hoped that the research presented in this thesis can contribute to these discussions. In addition, there are other areas that this research has raised as of importance but which have had far less attention in the digital humanities community (such as radical trust, and visitor generated content as a whole concept), and it is to these that it is hoped this study makes a significant contribution. Finally, it is anticipated that this very practice of looking beyond established sources of visitor evaluation can help to infuse new perspectives into current debates.

## 8.8 FUTURE RESEARCH

The research done is an important first step but there is still a lot of ground to cover in the future. In Section 9.7 we identified some limitations of the research presented here, and future research might address some of these. Undertaking research to look at digital innovation processes across the UK would be an obvious place to start. Relatively little theoretical and empirical research has previously been done on how museums approach digital innovation. Consequently, rigorous definitions, evaluation methodologies and metrics for digital

innovation in the museum sector are lacking. Although this thesis provides some insights into the challenges of implementing digital innovation in a museum environment, there is a need for dedicated research focusing on how in general digital innovations in museums should be defined, developed, implemented and evaluated.

It would also be productive to have gained from more direct engagement from visitors. There is clearly also scope for a fuller examination of visitor engagement with digital visitor generated content by involving more traditional forms of visitor research alongside evaluating the digital outputs, including interviews, surveys and conversation analysis which may be beneficial for creating a fuller picture of visitor engagement with digital visitor generated content.

There is an opportunity too for a deeper investigation of the Social Interpretation project, as this thesis focused solely on the in-gallery application. There is scope for research into the differences and similarities between digital visitor generated content in-gallery, online and via mobile devices. Of particular interest would be the opportunity to reflect upon the nature of the contributions from online users and those within the gallery space.

The findings from this study support the initial discussion of this thesis about the importance of understanding how these types of digital innovation projects are impacting on visitor experience. This is an initial step towards a new and developing area where there is plenty of

scope for continued work in developing, testing, and understanding technology within the museum space.

## 8.9 CONCLUDING REMARKS

This research has demonstrated that digital visitor generated content can be a viable option for digital engagement in museums and provides a valuable guide for further development and refinement of applications, content and evaluation. A significant discovery during this research is that of the value of practicing radical trust. In particular, the Grant Museum findings have highlighted that radical trust in visitors does indeed work: spamming and inappropriate commenting does not appear to have happened to a significant extent. By embracing radical trust and offering opportunities for visitors to consume and co-create digital interpretation, the institution has taken a proactive role in developing new interpretations around the museum collection. This research has also highlighted a number of issues that museums face when conducting digital innovation projects. The Social Interpretation project in particular highlights the challenges of implementing digital innovation in a museum environment, emphasising the issues of trying to work in an agile and user centred manner in a large national institution. There is a requirement to establish an infrastructure that supports the creation and implementation of innovative digital projects, which in turn can effect institutional change. Successful digital

innovation projects need to work with the strengths and values of the institution and provide continuous support throughout the change process.

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# APPENDIX 1: TECHNICAL DETAILS OF THE QRATOR APPLICATION

**Principle Investigator:** Claire Warwick

**Named researchers:** Claire Ross, Steven Gray, Melissa Terras, Andy Hudson-Smith, Mark Carnall, Tonya Nelson, Stuart Robson.

**Core project team:** Claire Ross, Steven Gray.

**Funder:** HEFCE Beacon for Public Engagement Innovation Seed Fund- UCL.

**Funded amount:** £17,701 (non FeC)

**Departments involved:** UCL Centre for Digital Humanities (UCLDH), UCL Bartlett Centre for Advanced Spatial Analysis (CASA), and UCL Museums

**Project duration:** Originally funded from November 2010- December 2011, project now funded by the Grant Museum and is ongoing.

**Website:** http://www.qrator.org/

**iPad Application:** The QRator iPad application was developed by Steven Gray from the Bartlett Centre for Advanced Spatial Analysis and is written using Objective-C. Objective-C is the primary programming language used for writing software for OS X and iOS. The QRator

application runs on ten iPads within the Grant Museum. For details of the front end of the QRator iPad Application see section 4.2.

**QRator Website:** The QRator Website[148] provides a portal for the public to access and engage with the QRator system from outside the museum. The website is a customised version of the WordPress[149] blogging platform. It displays all current and archived QRator questions from the Grant Museum. The website provides a live updating feed of visitor responses to the ten QRator questions, which is synchronised with the iPad interactive labels within the museum.

**QRator System diagram:**

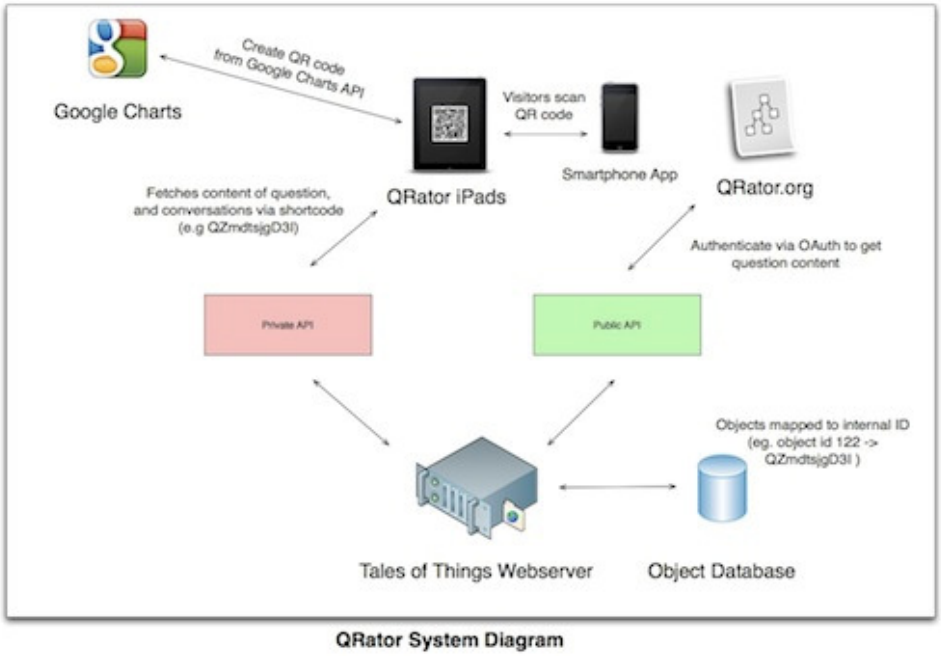



Figure 61: QRator system diagram with links to "Tales of Things" infrastructure. Taken from (Gray et al. 2012).

[148] http://www.qrator.org
[149] http://www.wordpress.org

**Server Infrastructure:** QRator relies heavily on the 'Tales of Things' or ToTeM, infrastructure to record visitor responses.

**Tales of Things application:** Tales of Things[150] was developed by Ralph Barthel and Martin de Jode from the Bartlett Centre for Advanced Spatial Analysis as part of collaboration between Brunel University, Edinburgh University, University of Dundee, University of Salford and UCL funded by Research Councils UK Digital Economy Program.[151] Tales of Things, allows users to attach their memories or 'tales' to any object and share them with other users (De Jode et al. 2011). Tales of Things consists of a database-driven web application and a variety of clients; including a web browser, mobile application, and custom RFID[152] readers. The web application has been developed with the Python Web Framework Django[153] and a My SQL[154] database.

The Tales of Things application consists of objects or 'things' that have a number of 'tales' associated to them. When a new 'thing' is created, users are asked to provide a name, description, status (public or private) and keywords. The creation of a new thing invokes the generation of a unique two-dimensional barcode (QR Code) for the database object. This code can subsequently be printed out and attached to the physical object. A tale in the system consists of a title, a story as text, and keywords as mandatory elements.

[150] http://www.talesofthings.com
[151] http://www.rcuk.ac.uk/research/xrcprogrammes/Digital/
[152] Radio-frequency identification is the non-contact wireless use of radio-frequency electromagnetic fields to transfer data
[153] https://www.djangoproject.com/
[154] http://www.mysql.com/

**QRator linking to Tales of Things:** The 'Tales of Things' database is central to the QRator application as each iPad question is stored as an object within the Tales of Things database. In the same way that users attach their 'tales' or memories to physical objects, museum visitors attach their comments and interactions to the question in the QRator application. Staff from the Grant museum enter a QRator question into the Tales of Things website, in the same way a user would an object or 'thing'. The QR code produced by the Tales of Things system contains an URL that links an object, via a unique 11 digit alphanumeric code to the entry in the database. It is this unique identifier that allows QRator to contact Tales of Things to retrieve the relevant data about the question via a private, internal API (Application Programming Interface). This is then uploaded to the QRator iPad and website simultaneously.

For further information about QRator see:

Carnall, M., Ashby, J. and Ross, C., 2013. Natural History Museums as Provocateurs for Dialogue and Debate. *Museum Management and Curatorship*, 28(1), pp.37–41.

Gray, S., Ross, C., Hudson-Smith, A., and Warwick, C. 2012. Enhancing Museum Narratives with the QRator Project: a Tasmanian devil, a Platypus and a Dead Man in a Box. In In N. Proctor and R. Cherry, eds. *Museums and the Web 2012*. Silver Spring, MD: Museums and the Web.

Available at: http://www.museumsandtheweb.com/mw2012/papers/enhancing_museum_narratives_with_the_qrator_pr. [Accessed 15/4/2012].

Hudson-Smith, A., Gray, S., Ross, C., Barthel, R., de Jode, M., Warwick, C., and Terras, M. 2012. Experiments with the Internet of Things in Museum Space: QRator. International Workshop on Digital Object Memories for the Internet of Things, DOMe-IoT 2012. 14th International Conference on Ubiquitous Computing (Ubicomp 2012), September 8, 2012 in Pittsburgh, PA, USA.

Ross, C. 2012. Social media for Digital Humanities and Community Engagement. In Warwick, C., Terras, M., Nyhan. J. (Eds). Digital Humanities in Practice. Facet, pp. 24-45

Ross, C. Carnall, M., Hudson-Smith, A., Warwick, C., Terras. M. and Gray, S. 2013. Enhancing Museum Narratives: Tales of Things and UCL's Grant Museum. In J. Farman, ed. The Mobile Story: Narrative Practices with Locative technologies. London: Routledge, pp. 276–289

Ross, C., Gray, S., Warwick, C., Hudson-Smith, A., and Terras, M. 2012. Engaging the Museum Space: Mobilising Visitor Engagement with Digital Content Creation. *Digital Humanities 2012*, July 2012, Hamburg Available at: http://www.dh2012.uni-hamburg.de/conference/programme/ [Accessed 27/7/2012].

Ross, C., Speed, C., Hudson-Smith, A., Gray, S. 2012. Smart Objects for Direct and Transient Public Engagement in Museum Spaces and Social Networks. *Museum Next 2012*, May 2012, Barcelona.

# APPENDIX 2: TECHNICAL DETAILS OF THE SOCIAL INTERPRETATION APPLICATION

**Project Partners:** UCLDH, Knowledge Integration, Imperial War Museums, and Gooii.

**Project Director:** was Tom Grinstead, followed by Carolyn Royston, Head of Digital Media, IWM

**Project Manager:** Jane Audas

**Project Partner Lead UCLDH:** Claire Ross

**Project Partner Lead KI:** Rob Tice

**Project Partner Lead Gooii:** Tarras Johnson

**Project team:** Jermey Ottenvanger, Wendy Orr, Christian Statham, Laura Whalley James McSherry (IWM) Claire Warwick, Melissa Terras (UCLDH)

Additional consultancy from Andy Hudson Smith (UCL CASA), and Ben Tandy (freelance)

**Funder:** Nesta, Arts Council, AHRC. Digital Research and Development Fund for Arts and Culture.

**Funded amount:** £84,500 (non FeC)

**Project duration:** November 2011 to January 2013

**Website:** http://blogs.iwm.org.uk/social-interpretation/

**SI Application:** The Social Interpretation application was developed by Ben Tandy, a freelance developer contracted to IWM. The Social Interpretation (SI) kiosks are Adobe Air[155] applications sitting on devices running Windows (in IWM London tablets were used in IWM North touchscreen PC were used). The Social Interpretation application runs on 6 tablets within IWM London and 4 touch screen PC's in IWM North. For details of the front-end of the Social interpretation application see section 5.2 and 6.2. The SI applications for IWM London and IWM North were for all intents and purposes the same application but configured with XML[156] and overlaid with different front end interfaces. The kiosks were also connected to the SICE API in order to read and write comments.

**SI website:** IWM also added Social Interpretation elements to its website[157] at the end of July 2012 creating the 'My IWM' interface[158]. The My IWM website was built using Drupal[159], a separate version of Drupal from the main IWM website; this separation was undertaken for security purposes. Visitors to the website were able to curate and annotate their own unique collection of objects and then share them with friends. Each individual object page includes, at the top right hand

[155] http://www.adobe.com/uk/products/air.html
[156] Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
[157] http://www.iwm.org.uk/
[158] http://users.iwm.org.uk/
[159] https://drupal.org/

side of the page, icons indicating comments and the option to 'collect' and 'share'(Figure 62), and below the object record itself is the comment thread and comment box, and to read what other people had to say about objects in the collection. There was no active promotion of SI on the website: all collections (Figure 63) and comments have been created organically, by users visiting pages and stumbling across the functions (or through word-of-mouth). Users can create an IWM account or use their Twitter login (Facebook will also be added). Any visitor contributions on the object pages happens on the main IWM website, whereas login details, the user's profile page, and personal collections are through the users.iwm.org.uk subdomain.

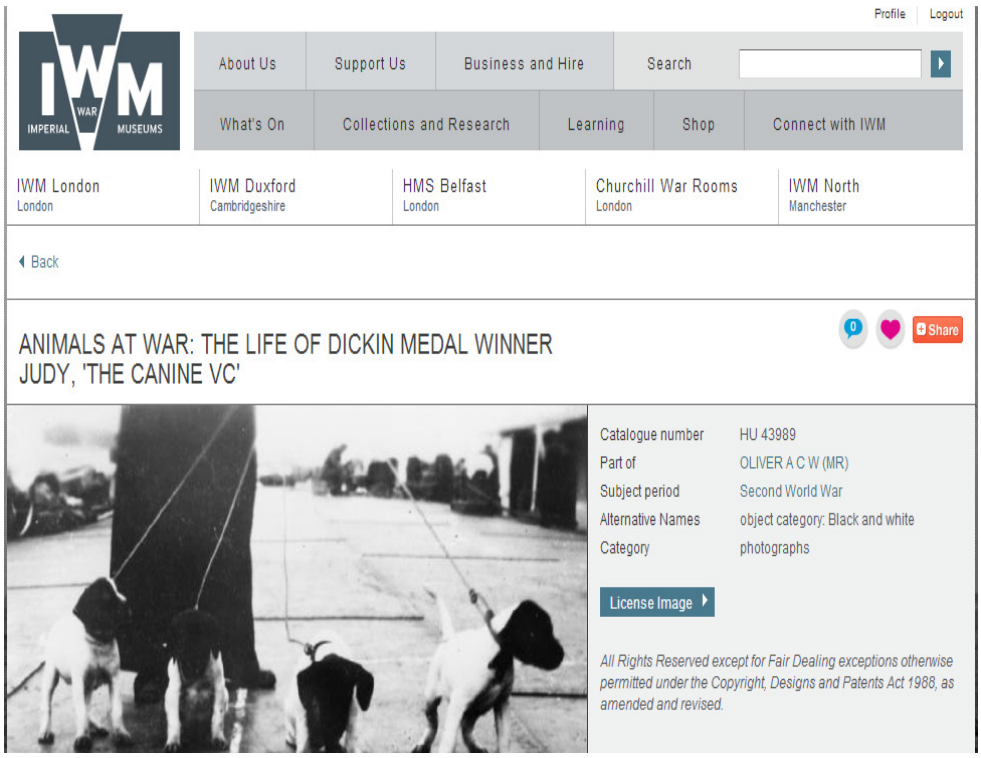



Figure 62: Object page highlighting comment, collect and share icons

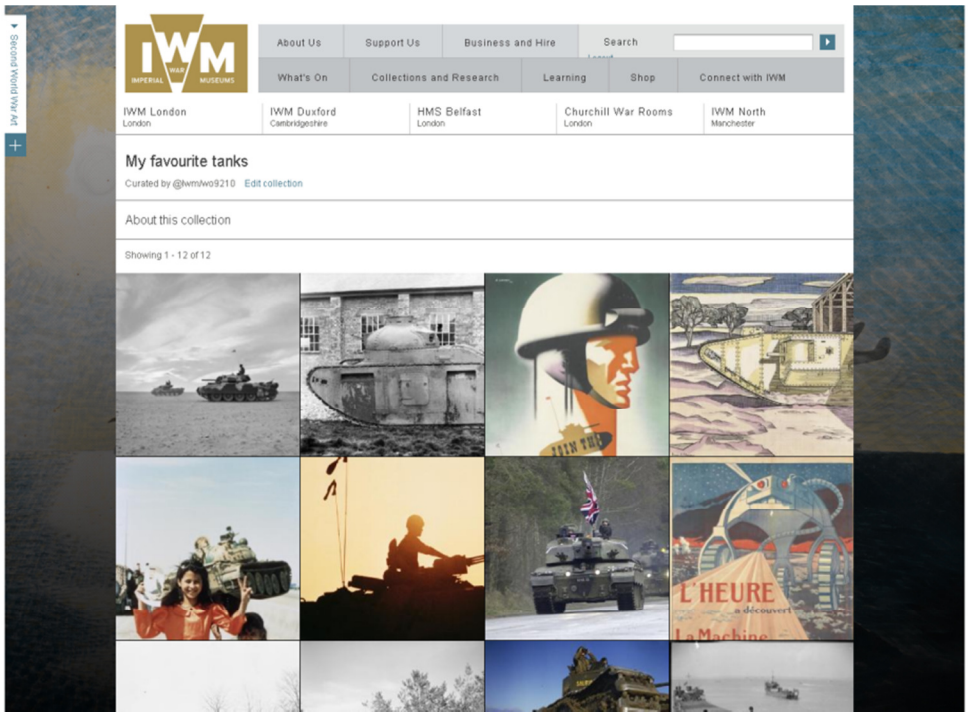



Figure 63: Example Collection page

**SI Mobile:** The SI mobile application (Figure 64) developed by Gooii, and designed for both the Apple iOS and Android platforms allows for a more personalised presentation and interaction with objects. The application includes a QR code scanner to scan an object's QR code in IWM exhibition spaces and get unique content about that object. It also contains the ability to search the entire catalogue of IWM's collections, which covers over 750,000 objects and the facility to create and share visitor stories, memories and experiences as well as create a personal collection of objects. QR codes were used throughout the gallery spaces to facilitate physical/digital interaction which enables visitors to use museum objects as keys into more information. Eight QR codes are situated next to objects and artworks in *A Family in Wartime*, mostly small objects such as a dress made of parachute silk, food ration books

and a set of railway timetables. QR codes were also placed next to nineteen of the individual paintings in the Breakthrough Art gallery in IWM London. In IWM North, QR codes were placed next to nine objects in the main gallery, including a nuclear bomb, a piece of the Berlin Wall, steelwork from the 9/11 World Trade Centre, and a child's gas mask. The mobile app acts as a bridge enabling visitors to add their own comment to the specific objects, to search, collect and share museum objects. The SI Team discussed alternatives to using QR codes throughout the initial stages of the project; however QR codes were selected due to being the cheapest and easiest option.

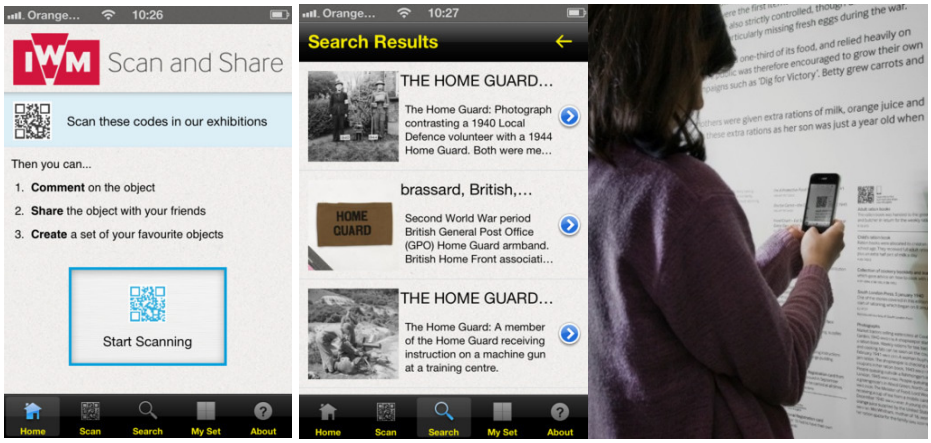
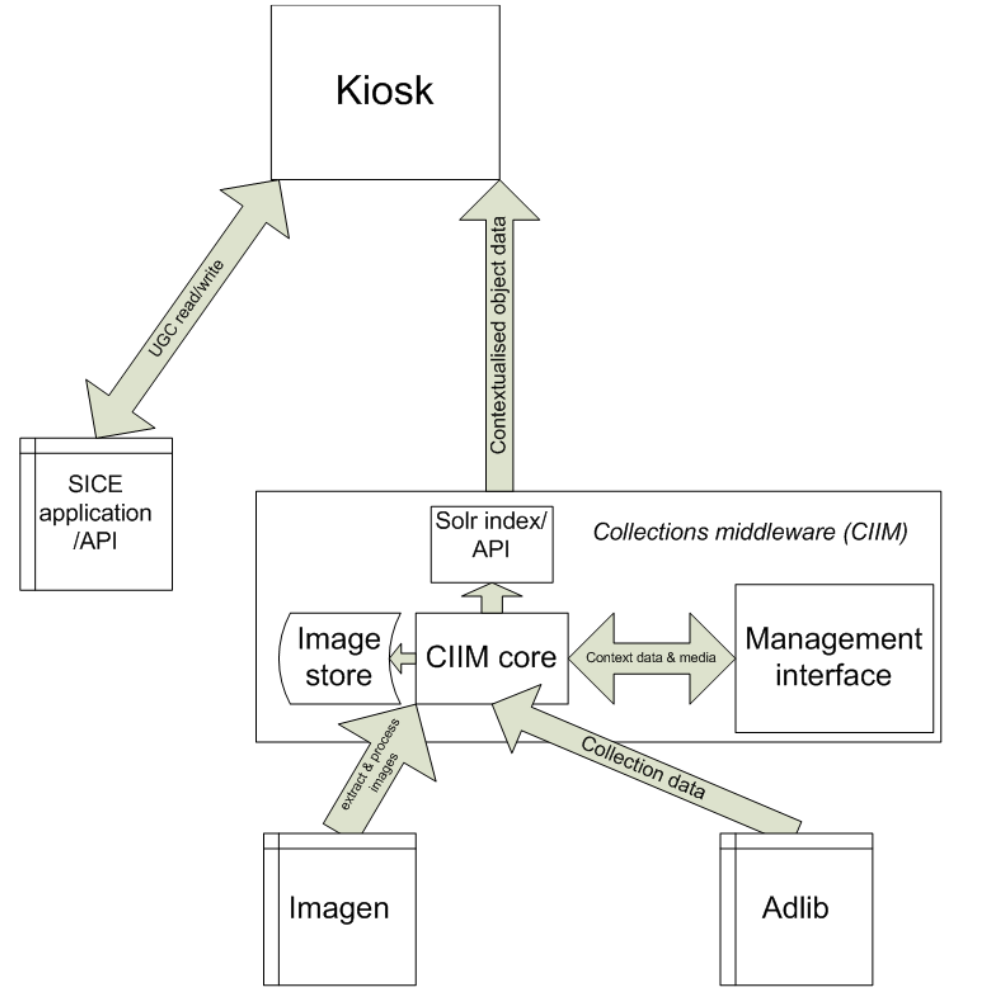



Figure 64: Social Interpretation mobile interface and of use in the *A Family in Wartime* Gallery, IWM London

**System Diagram:**




Data from Adlib is pulled into the CIIM and processed along the way. Once there, contextual content can be added by IWM staff in the management interface (e.g. text like questions, alternative descriptions or captions, or media, dates etc). Adlib data and context data are provided together through a single index which is used by the kiosks
UGC data is called from the SICE API and also written to it.
**Kiosks in normal operation:** The kiosks can contact the SICE API all the time, and reads from and writes to it in real-time. They keep a local copy of all comments on the item that they show, as well as likes, replies and reports. The kiosks contact the CIIM in the morning when they start up, and get the data for their particular object from the solr index there, along with images. They should store this as a static file(?)
**Kiosks in failure mode:** When kiosks cannot contact SICE API they use their local store of comments and store any new comments, synching them when the link is re-established. The isolated behaviour should be exactly the same as when connected – reporting will remove comments etc – but comments from outside will not be picked up. When kiosks cannot contact the CIIM then should use their local copy of the XML and images.

Figure 65: Social Interpretation system diagram with links to the CIIM infrastructure. Provided by Ottenvanger 2013 pers. comm. 31st December.

**Server Infrastructure:** The SI project was based around technology developed by Knowledge Integration, a modular suite of software called the Collections Information Integration Middleware (CIIM)[160].

**The CIIM**: CIIM is a modular suite of software which sits between IWM's Collections Management System (CMS)[161] and the main IWM online collection[162]. The IWM implementation extracts the object data from the collections management system via their API and places it into a SOLR[163] index for fast and scalable searching. It performs data validation, terminology alignment, public location augmentation and image purchase linking as well as interfacing with their digital asset management system. The CIIM system was built by Knowledge Integration (K-Int), a software company with a history of working in the cultural heritage sector, examples include the Museum of London, National Maritime Museum, the Horniman Museum and Gardens, the Collections Trust's Culture Grid and Europeana.

In addition to the core CIIM the Imperial War Museum also implemented a real-time user generated content module which was developed by K-Int specifically for the Social Interpretation project in conjunction with IWM. This module allows user generated content and collections to be created in gallery, via a mobile application (developed

[160] http://www.k-int.com/products/ciim
[161] IWM uses Adlib (http://www.adlibsoft.com/products/museum-collection-management-software) and Imagen in a SQL Server 2008 environment. Microsoft SQL Server 2008 is a data management system that delivers a rich set of features, data protection, and performance for embedded application clients, Web applications, and local data stores.
[162] http://www.iwm.org.uk/collections/search
[163] Solr is an open source enterprise search platform from the Apache Lucene project (http://lucene.apache.org/). Its major features include full-text search, hit highlighting, faceted search, dynamic clustering, database integration, and rich document handling.

by Gooii) and via the web but to be seamlessly visible across all platforms and post moderated. Additional Social Interpretation content was added to core collection data to provide in gallery prompts to promote discussion and sharing via the contextual interface. This additional content is available via the in-gallery SI application kiosks, on a mobile application via QR codes and at static URLs online. Data is also made available via OAI and OpenSearch.

The SI application/API is a Java[164] application that uses MySQL[165] as a data store and ElasticSearch[166] as an index. The index is produces results very quickly, as JSON (JavaScript Object Notation)[167]. The whole thing is a web application, meaning it all happens over HTTP (Hypertext Transfer Protocol). IWM run that web application on a server at Rackspace[168], where most of the IWM web servers run.

For more information about Social Interpretation see:

Ross, C., Terras, M. and Royston, C., 2013. Visitors, Digital Innovation and a Squander Bug: Reflections on Digital R&D for Audience Engagement and Institutional Impact. In N. Proctor and R. Cherry, eds. *Museums and the Web 2013*. Silver Spring, MD: Museums and the Web. Available at: http://mw2013.museumsandtheweb.com/paper/visitors-digital-innovation-and-a-squander-bug-reflections-on-digital-rd-for-

[164] https://www.java.com/en/
[165] http://www.mysql.com/
[166] http://www.elasticsearch.org/
[167] http://www.json.org/
[168] http://www.rackspace.co.uk/

audience-engagement-and-institutional-impact/. [Accessed 21/4/2013].

Ross, C., and Royston, C. 2013. Visitors, Digital Innovation and a Squander Bug: Reflections on Digital R&D for Audience Engagement and Institutional Impact. *MuseumNext 2013*. Amsterdam 12-14 May 2013.

Royston, C., and Ottevanger.J. 2013. "Social Interpretation" as a catalyst for organisational change*. iSay: Visitor-Generated Content in Heritage Institutions. The Shape of Things*. Leicester. 1st February 2013.

# APPENDIX 3: IMPERIAL WAR MUSEUM FUNDING AGREEMENT

Department for Culture, Media and Sport
Arts & Heritage

2-4 Cockspur Street
London SW1Y 5DH
www.culture.gov.uk

Tel 020 7211 6392
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helen.williams@culture.gsi.gov.uk

Diane Lees
Director-General
Imperial War Museum
Lambeth Road
London
SE1 6HZ

20 April 2011

department for culture, media and sport

Dear Diane

**FUNDING AGREEMENT FROM 1 APRIL 2011**

This letter will act as an interim funding agreement between the Department for Culture, Media and Sport and the Imperial War Museum from 1 April 2011. This agreement and the Imperial War Museum's Financial Memorandum and Management Statement will remain in force until they are replaced by a framework document.

I would be grateful if you could indicate your acceptance/consent to this agreement by return of letter.

Financial Allocation

The Imperial War Museum's allocations for 2011-12 to 2014-15 are as set out in the Secretary of State's letter of 20 October 2010 and in any subsequent letters which update these allocations.

The grant in aid allocation is dependent on the Imperial War Museum maintaining free admission to the permanent collections.

Priorities

The Secretary of State's letter of 20 October 2010 also sets out his priorities for the next four years. He expects:

- the world-class collections and front-line services of the Imperial War Museum to be protected;
- that free entry to the permanent collections of the national museums will continue to be available;

- that the Imperial War Museum will continue to work in partnership with other museums in the UK;
- that the Imperial War Museum will pursue ways to increase its self-generated income, including through private giving;
- that the Imperial War Museum supports the Cultural Olympiad.

Compliance

The Imperial War Museum will undertake to:

- Comply with all relevant legislation;
- Comply with its Management Statement and Financial Memorandum;
- Observe the requirements of Managing Public Money.

The Department will expect the Imperial War Museum to comply with the latest controls issued by the Department, which are currently set out in 'Implementing the Additional Spend Controls and Authorisations 2011'. Changes to controls will be notified in writing as and when they occur. If there is a specific concern that a control may interfere with the Trustees' obligation to fulfil their charitable duties, then the Department must be notified of the specific instance, setting out the detail of the non-compliance, so that an exemption can be considered.

Performance and Monitoring

The Imperial War Museum will supply DCMS each year with the regular financial information set out in the data collection schedule, as well as returns against 12 performance indicators supplied by DCMS (annexed).

This information, together with Annual Reports and any further reports the Imperial War Museum prepares in relation to progress against its own corporate priorities, will be used to monitor annual performance.

Yours sincerely

Helen Williams
Head of Heritage

## PERFORMANCE INDICATORS

### Access

1. Number of visits to the museum/gallery (excluding virtual visitors)
2. Number of unique website visits

### Audience Profile

3. Number of visits by children under 16
4. Number of visits by UK adult visitors aged 16 or over from NS-SEC groups 5-8
5. Number of visits by UK adult visitors aged 16 and over from an ethnic minority background
6. Number of visits by UK adult visitors aged 16 and over who consider themselves to have a limiting long-term illness, disability or infirmity
7. Number of overseas visits

### Learning/Outreach

8. ***Children***
- Number of facilitated and self-directed visits to the museum/gallery by children under 16 in formal education
- Number of instances of children under 16 participating in on-site organised activities
- Number of instances of children under 16 participating in outreach activity outside the museum/gallery

9. ***Adults***
- Number of instances of adults aged 16 and over participating in organised activities at the museum/gallery
- Number of instances of adults aged 16 and over participating in outreach activities outside the museum/gallery

### Visitor Satisfaction

10. % of visitors who would recommend a visit

### Income Generation

11. ***Self-Generated Income***
    - Admissions
    - Trading
    - Fundraising

### Regional Engagement

12. Number of UK loan venues

FROM THE DIRECTOR GENERAL

Diane Lees FMA FRSA

IMPERIAL WAR MUSEUM

Imperial War Museum London
Lambeth Road
London SE1 6HZ

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Email dlees@iwm.org.uk

Website www.iwm.org.uk
Our Ref DL/CS/11/78

Helen Williams
Head of Museums, Libraries and Archives
Department for Culture, Media and Sport
2-4 Cockspur Street
LONDON
SW1Y 5DH

5 July 2011

Dear Helen

**Funding Agreement from 1 April 2011**

Further to my letter of 7 April, and the Interim Funding Agreement sent on 20 April, I hereby write giving consent to this Agreement.

Best wishes

Diane

# APPENDIX 4: UNDERSTANDING VISITOR GESTURES

This section discusses the previous research on gestures and behaviour which the author found helpful during the video based observation data collection and analysis. Touch interaction on digital devices such as smartphones, tablet computers and touch tables have become one of the most prevalent modes of interaction with technology for many users (Anthony et al. 2013). These devices all support some form of surface gesture interaction, but the interaction styles used are often dependent on the platform and application. While some gestures have emerged as cross-platform standards, such as swipe, pinch-to-zoom, and drag-to-pan, there is still quite a variety of other gestures in use (Anthony et al. 2013, p.157) for specific apps and in specific contexts which still need to be better understood.

Gesture-based interaction on touch-enabled surfaces has been studied extensively in the HCI literature, particularly from a usability perspective (Wobbrock et al. 2009; Kammer et al. 2010). Other areas that have been examined include; multitouch gestures (Frisch et al. 2009; Kammer et al. 2010), accessible gestures (Kane et al. 2011), and differences between stylus and finger gesture input (Tu et al. 2012). Karam and schraefel (2005) provide a concise overview of the diversity within the field of gesture based computer interactions, and present a taxonomy of gestures as a human computer interaction technique (Karam and Schraefel 2005) which proved to be a useful starting point

when looking at visitor gestures and digital visitor generated content systems. Efron (1941) conducted one of the first studies of discursive human gesture resulting in five categories on which later taxonomies were built. The categories were physiographics, kinetographics, ideographics, deictics, and batons. The first two are combined together as iconics in McNeill's classification (McNeill 1992). McNeill also identifies metaphorics, deictics, and beats. Because Efron's and McNeill's studies were based on human discourse, their categories have only limited applicability to digital interactive gestures. Poggi (2002) offers a typology of four dimensions along which gestures can differ: relationship to speech, spontaneity, mapping to meaning, and semantic content. Mapping to meaning is of specific interest to understanding the nature of visitor gestures and behaviours in relation to digital visitor generated content systems. Poggi (2002, p.159) suggests that gestures are linked to their meaning by mechanical determinism and are biological or natural signals. This suggests that it is possible to infer meaning from gestures alone. In work examining gestures for single-user interaction, Wobbrock et al. (2009) present taxonomy of surface gestures based on user behaviour. Based on a collection of gestures from twenty participants, their taxonomy classifies gestures into four dimensions: form, nature, binding, and flow. They also create a user-specified gesture set.

There has been a noteworthy lack of published research on how visitors use gestures to interact with museum objects. A few authors (Meisner

et al. 2007; Christidou 2013) have considered visitor gestures, specifically pointing, as indicators of learning and engagement. However, there is a paucity of research concerning the ways visitors examine, gesture toward, and experience objects in museums (Heath and vom Lehn 2004).

On a basic level gestures originate from natural interaction between people. They consist of movements of the hands, body and face as non-verbal communication with the intent to convey information or interact with the environment. Cadoz (1994) describes three functional roles of human gesture; semiotic, ergotic, and epistemic. Semiotic gestures communicate meaningful information, ergotic gestures manipulate physical objects and epistemic to discover the environment through tactile experience (Hinckley 2008, p.146). To the author's knowledge no research has been published describing the gesture set for digital visitor generated content applications in museums. The exploratory study in Chapter 4 and 6 explores the use of video based observations for capturing visitor gestures in relation to engagement with the digital visitor generated content devices. The analysis focuses on ergotic gestures in an attempt to understand how visitors to the Grant Museum and Imperial War Museum North interact with the visitor generated content digital applications; QRator and Social Interpretation.